HP EliteBook Revolve 810 G3

Maintenance and Service Guide

Product notice

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This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows 8. This computer may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See http://www.microsoft.com for details.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

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Important Notice about Customer Self-Repair Parts

⚠ **CAUTION:** Your computer includes Customer Self-Repair parts and parts that should only be accessed by an authorized service provider. See Chapter 5, "Removal and replacement procedures for Customer Self-Repair parts," for details. Accessing parts described in Chapter 6, "Removal and replacement procedures for Authorized Service Provider only parts," can damage the computer or void your warranty.

Safety warning notice

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

Table of contents

1 Product description

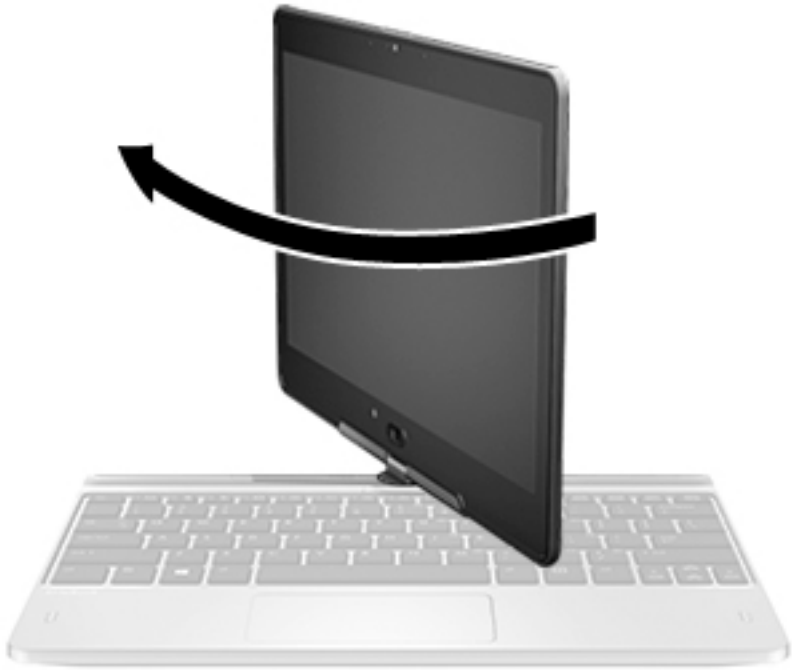
Category	Description
Product Name	HP EliteBook Revolve 810 G3
Processors	• Intel® Core® i7-5600U 2.60-GHz (SC turbo up to 3.20-GHz) processor (4.0-MB L3 cache, dual core, 15-W) • Intel Core i7-5500U 2.40-GHz (SC turbo up to 3.00-GHz) processor (4.0-MB L3 cache, dual core, 15-W) • Intel Core i5-5300U 2.30-GHz (SC turbo up to 2.90-GHz) processor (3.0-MB L3 cache, dual core, 15-W) • Intel Core i5-5200U 2.20-GHz (SC turbo up to 2.70-GHz) processor (3.0-MB L3 cache, dual core, 15-W) • Intel Core i3-5010U 2.10-GHz processor (3.0-MB L3 cache, dual core, 15-W)
Chipset	Intel integrated on processor
Graphics	Intel UMA Graphics with shared video memory Support for dual-display ports through the dock
Panel	11.6-in, high-definition (HD), (1366×768), light-emitting diode (LED), low-voltage differential signalling (LVDS), UWVA , ultraslim display with webcam and microphone Touchscreen enabled. Touch Controller: Atmel, 2952T1 Typical brightness: 400 nits
Memory	One customer-accessible/upgradable memory module slot + 4-GB on the system board Support for DDR3L PC-3 12800 (1600) Support for 12288-MB of system RAM in the following configurations: • 12288-MB (8192-MB memory module + 4096-MB on system board) • 8192-MB (4096-MB memory module + 4096-MB on system board) • 4096-MB (4096-MB on system board)
Solid-state drive	Serial ATA III Support for the following single solid-state drive configurations: • 512-MB, M2, SATA-3 • 256-MB, M2, SATA-3 • 256-MB, M2, SATA-3, SED, Opal 2 • 256-MB, M2, SATA-3, TLC • 180-MB, M2, SATA-3 • 180-MB, M2, SATA-3, SED, Opal 2 • 128-MB, M2, SATA-3 • 128-MB, M2, SATA-3, TLC
Audio and video	DTS Studio sound

Category	Description
Audio and video *(continued)*	Integrated dual-array microphones Stereo speakers (2) 720p webcam
Ethernet	Integrated Intel WGI218LM 10/100/1000 network interface card (NIC) S3 – Energy Start Wake-on-LAN (WOL) S4 – Microsoft WOL S5 – Customerss WOL
Wireless	Integrated wireless personal area network (WPAN) option supported through Bluetooth 4.0 combination card
	Two WLAN antennas built into display assembly
	Integrated wireless local area network (WLAN) options by way of wireless module Support for the following WLAN modules: • 11ac+BT4 2x2 PCIe+USB NGFF INDO • Intel Dual Band Wireless-N 7265AN 802.11 a/b/g/n 2×2 WiFi + BT 4.0 Combo Adapter
	Support for no WLAN/Bluetooth option
	Two wireless wide area network (WWAN) antennas built into computer
	Integrated WWAN options by way of wireless module Support for the following WWAN modules: • HP hs3110 HSPA+ Mobile Broadband Module • HP lt4211 LTE/EV-DO/HSPA+ Gobi 4G Module • HP lt4112 LTE/HSPA+ Gobi 4G Module
	WWAN secured by micro-SIM
	Support for no WWAN option
	Support for WWAN after market option
	Integrated NXP NPC100 near field communication (NFC) module and antenna
External media cards	Micro-Secure Digital (SD) slot
Ports	• AC adapter • Audio-in (mono microphone)/audio-out (stereo headphone) combination • DisplayPort 1.2 • Docking • RJ-45 (Ethernet) • USB 3.0 (2), (1 charging port)
Sensors	• Accelerometer • ALS • Compass • Gyro

Category	Description
Sensors *(continued)*	• NFC with Secure Element • Proximity (SAR)
Docking	Quest 1.0 and Quest 2.0
Keyboard/pointing devices	Full-size, backlit, spill-reistant keyboard with DuraKeys and active pen Gesture support: MultiTouch gestures enabled, two-finger scrolling, and pinch-zoom as default Taps enabled by default Support for ClickPad with image sensor, scroll, pinch, zoom, rotate, and 3-finger flick) Multitouch gestures enabled
Power requirements	Support for 65-W HP Smart AC adapter (RC, V, EM, 3-wire) and 45-W HP Smart AC adapter (non-PFV, RC, 3-wire) Power cord is configurable; either 1.8-meter (6.0-feet) or 1.0-meter (3.2-feet) For specific power cord options, see Miscellaneous parts on page 18.
	Support for 6-cell, 44-Wh, 1.98-Ah, Li-ion battery
Security	• Support for security cable lock • Support for Trusted Platfom Module (TPM) 1.2 Enhanced Drive Lock (not available in Asia Pacific countries and regions and the People's Republic of China) • HP ProtectTools (Limited Suite) • HP Power Assistant • Preboot Authentication (Password)
Operating system	**NOTE:** Windows 7 operating systems include Service Pack 1, Windows 8.1 Update. **Preinstalled:** • Windows 8.1 CH 64-bit (only available in China) • Windows 8.1 EM 64-bit • Windows 8.1 ML 64-bit • Windows 8.1 Professional 64-bit • Windows 8.1 Professional 64-bit – MSNA • Windows 8.1 Professional 64-bit for Education • Windows 8.1 Professional 64-bit DPK with Windows 7 image (not available in Asia Pacific countries and regions and the People's Republic of China) • Windows 8.1 Professional 64-bit DPK with Windows 7 image – MSNA • Windows 7 Professional 64-bit • Windows 7 Professional 64-bit – MSNA • FreeDos 2.0 **Restore media – DRDVD:** • DRDVD Windows 8.1 (available with Windows 8.1 or Windows 8.1 Professional Loc, required with any Windows 8.1 Professional Downgrade operating system) • DRDVD Windows 7 (available with Windows 7 Home Premium, Windows 7 Professional, or Windows 8.1 Professional Downgrade Loc) **Restore media – OSDVD:**

Category	Description
Operating system *(continued)*	• Windows 8.1 (Update) 64-bit (only available and required with Windows 8.1 Professional Downgrade operating system. Do not include for Asia Pacific countries or regions or the People's Republic of China) • Windows 8.1 Country-Specific (Update) 64-bit (for service only) • Windows 8.1 Emerging Market (Update) 64-bit (for service only) • Windows 8.1 Professional 64-bit (for service only) • Windows 8.1 Professional for Education (Update) 64-bit (for service only) • Windows 7 Professional 64-bit (available with Windows 7 Professional Loc. or Windows 8.1 Professional Downgrade Loc., not available for in Asia Pacific countries or regions or the People's Republic of China) **Certified**: Microsoft WHQL Web-only support: • Windows 8.1 Enterprise 64-bit • Windows 8 Chinese Market 64-bit • Windows 8 Emerging Markets 64-bit • Windows 8 Multilanguage 64-bit • Windows 8 Professional 64-bit • Windows 7 Enterprise 64-bit • Windows 7 Enterprise 32-bit • Windows 7 Professional 32-bit
Serviceability	**End user replaceable part:** • AC adapter • Battery • Docking station • Solid-state drive • System memory • WLAN module • WWAN module

2 External component identification



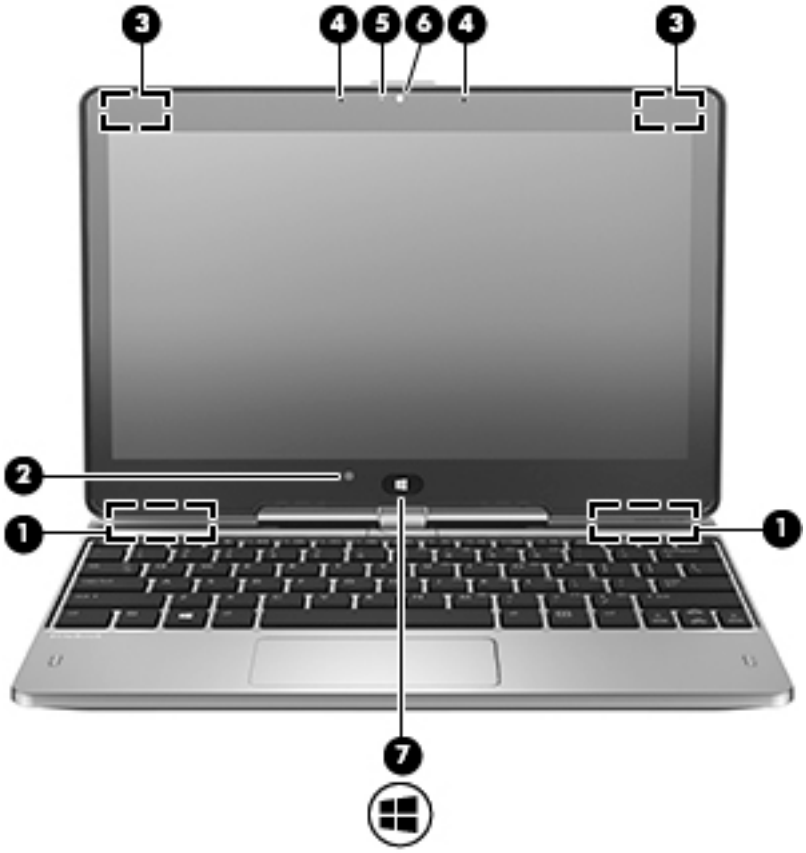
⚠ **CAUTION:** To prevent damage to the display hinges, when in notebook configuration, do not rotate the display counterclockwise, and do not force the rotating action.

To change your notebook to a tablet

1. Rotate the display clockwise 180 degrees until the display faces backwards.
2. Lower the display over the keyboard.

To change the tablet back into a notebook, reverse these steps.

Display

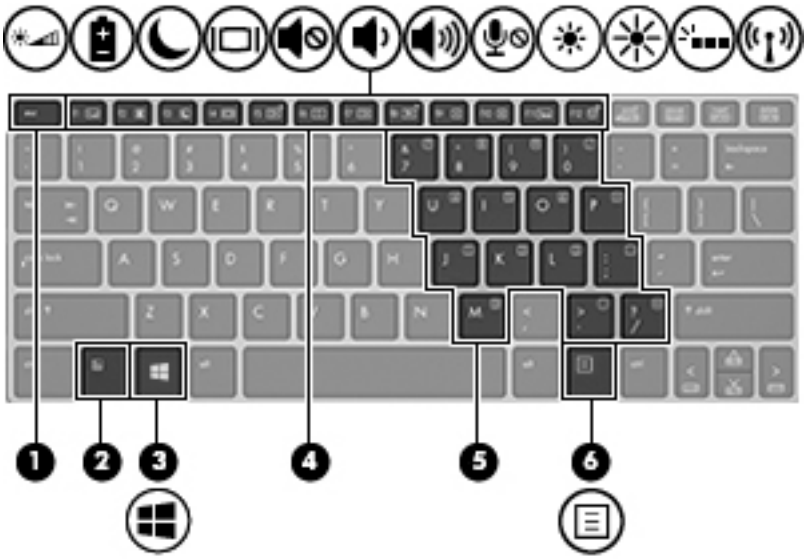


Item	Component	Description
(1)	WWAN antennas (2)*	Send and receive wireless signals to communicate with WWANs.
(2)	Ambient light sensor	Brightens or dims the display in response to ambient light.
(3)	WLAN antennas (2)*	Send and receive wireless signals to communicate with WLANs.
(4)	Internal microphones (2)	Record sound.
(5)	Webcam light	On: The webcam is in use.
(6)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video.
(7)	Windows Home button	Returns you to the Start screen.

*The antennas are not visible on the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. To access the user guides, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select **User guides**.

Keys

NOTE: Your computer may look slightly different from the illustration in this section.



Item	Component	Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key, the esc key, or the b key.
(3)	Windows button	Displays the Windows Start menu.
(4)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(5)	Embedded numeric keypad	When the keypad is turned on, it can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.
(6)	Windows application key	Displays options for a selected object.

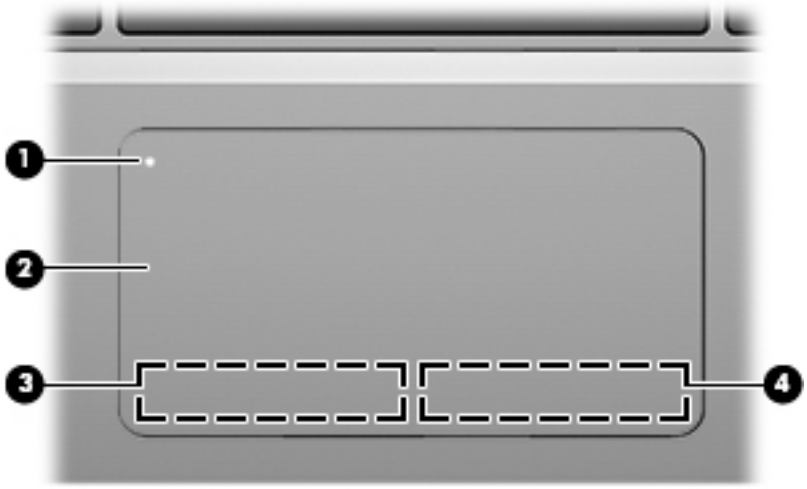
Lights

NOTE: Your computer may look slightly different from the illustration in this section.

Item	Component	Description
(1)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(2)	Mute light	• Amber: Computer sound is off. • Off: Computer sound is on.
(3)	Microphone mute light	• Amber: microphone sound is off. • Off: Microphone is on.
(4)	Wireless light	• On: An integrated wireless device, such as a WLAN device and/or a Bluetooth device, is on. **NOTE:** On some models, the wireless light is amber when all wireless devices are off.
(5)	Num lock light	On: Num lock is on.
(6)	TouchPad light	• On: The TouchPad is off. • Off: The TouchPad is on.

TouchPad

NOTE: Your computer may look slightly different from the illustration in this section.



Item	Component	Description
(1)	TouchPad on/off button	Turns the TouchPad on or off.
(2)	TouchPad zone	Moves the pointer and selects or activates items on the screen.
(3)	Left TouchPad button	Functions like the left button on an external mouse.
(4)	Right TouchPad button	Functions like the right button on an external mouse.

Left side

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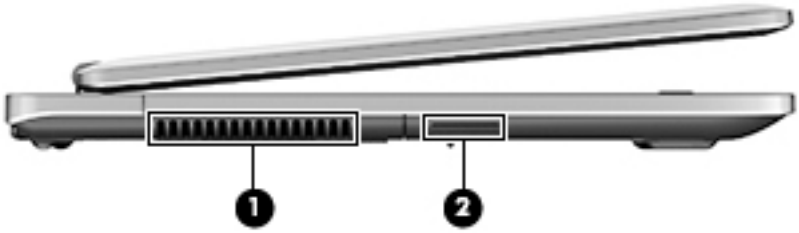
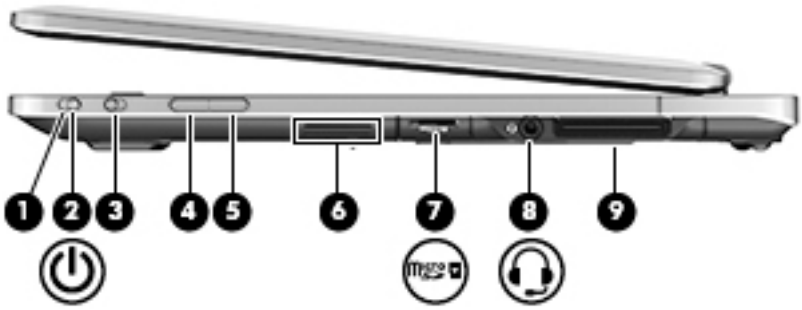


Item	Component	Description
(1)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	Speaker	Produces sound.

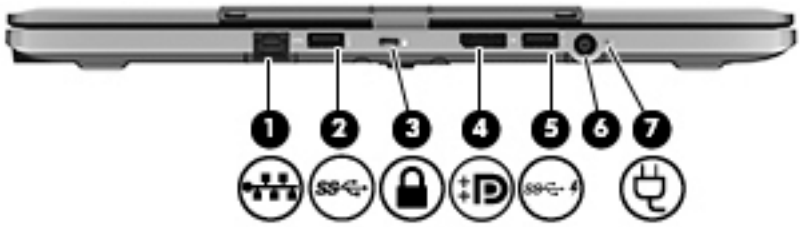
Right side



Item	Component	Description
(1)	Power button	Turns power on and off.
(2)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a powersaving state. The computer shuts off power to the display and other unneeded components. • The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(3)	Rotation lock	Locks screen orientation in either Landscape or Portrait mode. **NOTE:** When you move between notebook and tablet configuration, the computer screen will automatically change to vertical or horizontal. To lock the current screen orientation, slide the screen orientation button.
(4)	Volume button	Lowers the volume.
(5)	Volume button	Raises the volume.
(6)	Speaker	Produces sound.
(7)	Memory card reader	Reads optional memory cards that store, manage, share, or access information.
(8)	Audio-out (headphone) jack/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*. . **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(9)	Docking port	Connects an optional docking device.

Rear

NOTE: Your computer may look slightly different from the illustration in this section.



Item	Component	Description
(1)	RJ-45 (network) jack	Connects a network cable. • Green (left): The network is connected. • Amber (right): Activity is occurring on the network.
(2)	USB 3.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(3)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(4)	DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(5)	USB 3.0 charging port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. Standard USB ports will not charge all USB devices or will charge using a low current. Some USB devices require power and require you to use a powered port. **NOTE:** USB charging ports can also charge select models of cell phones and MP3 players, even when the computer is off.
(6)	Power connector	Connects an AC adapter.
(7)	AC adapter light	• White: The AC adapter is connected and the battery is charged. • Amber: The AC adapter is connected and the battery is charging. • Off: The computer is using DC power.

Bottom

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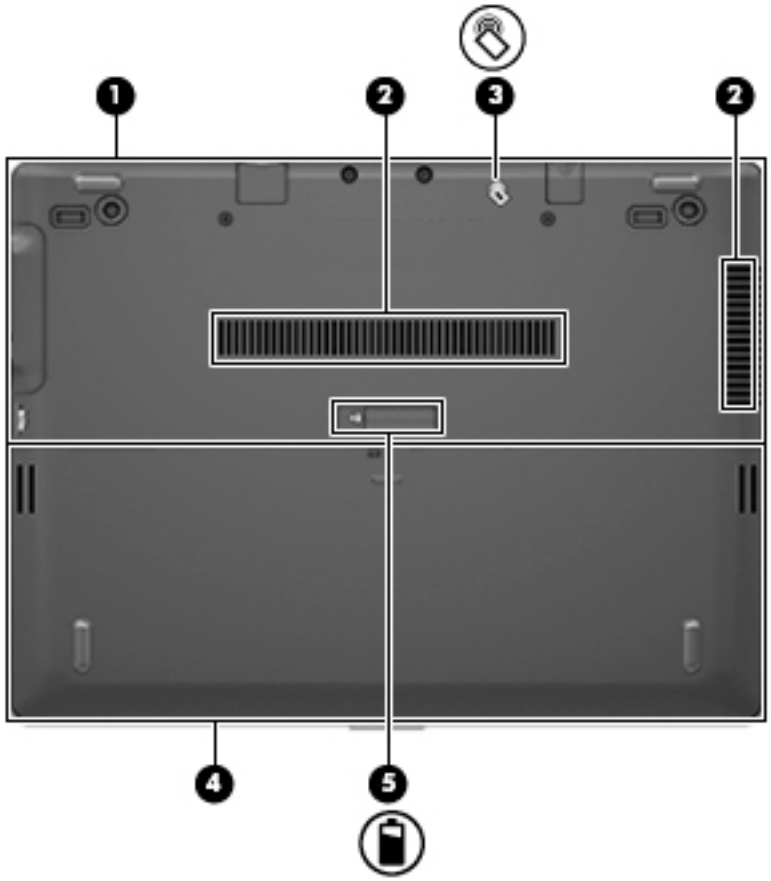
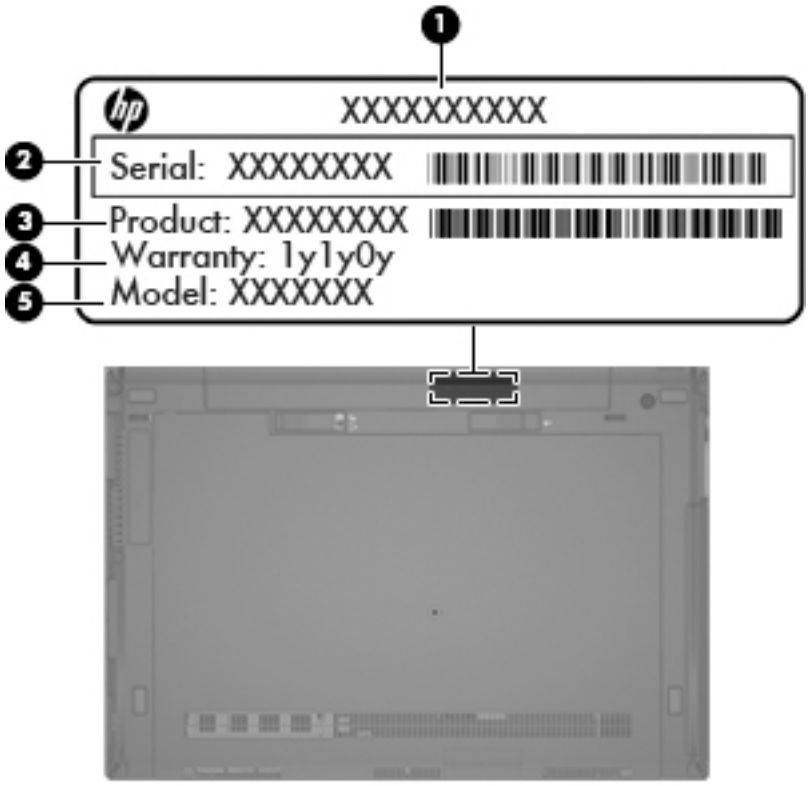


Item	Component	Description
(1)	Service cover	Gives access to the hard drive, the wireless LAN module slot, the WWAN module slot (select models only), and the memory module slots. **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region.
(2)	Vents	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	Near Field Communication (NFC) antenna	Allows you to connect wirelessly with, communicate with, and transfer data/info to and from your Near Field Communication (NFC)-compatible devices.
(4)	Battery bay	Holds the battery.
(5)	Battery bay cover release latch	Releases the battery cover over the battery bay.

3 Illustrated parts catalog

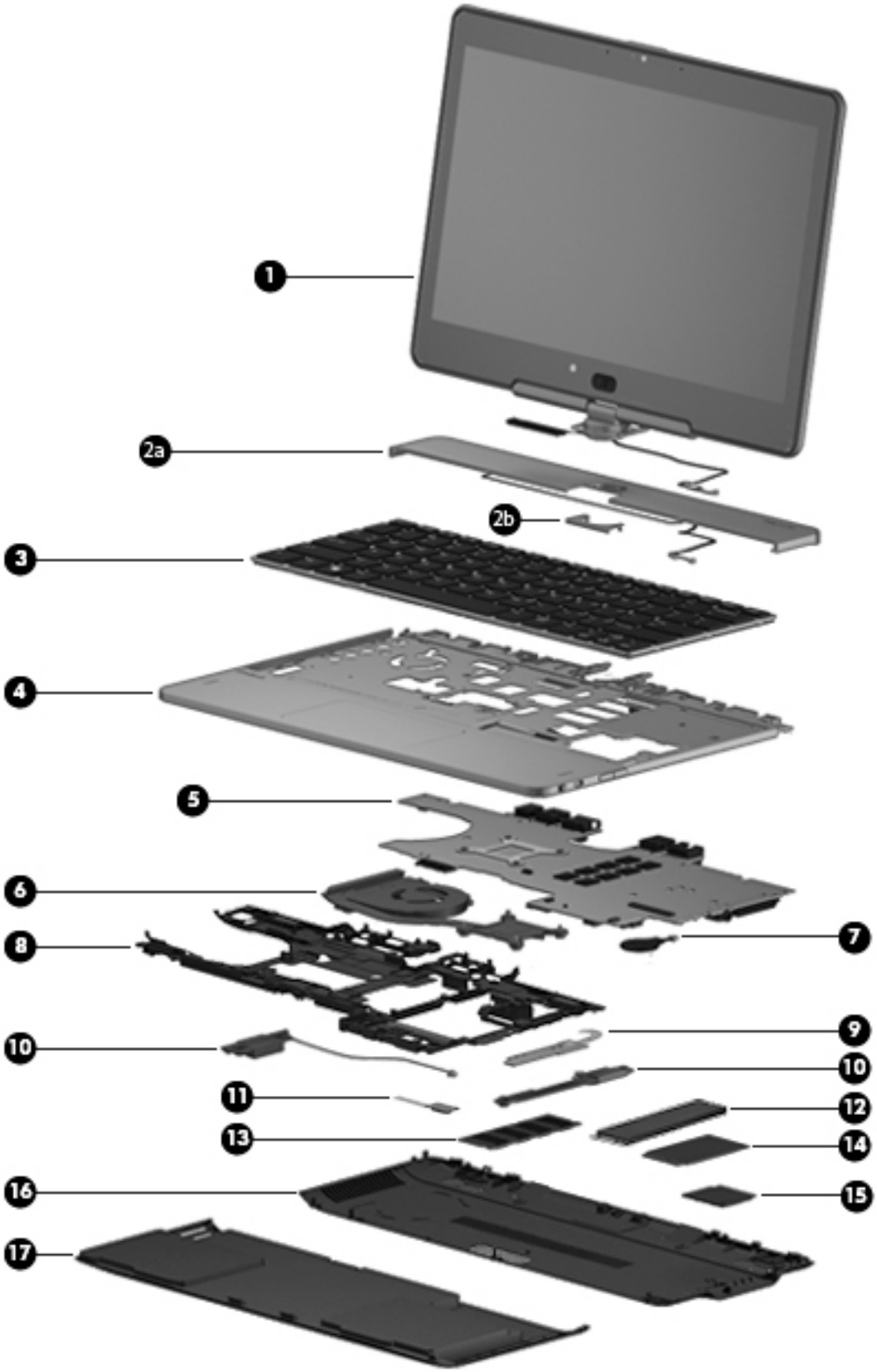
Service tag

When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag. It is necessary to remove the battery to obtain these numbers. See Bottom on page 13 for battery removal instructions.



Item	Description	Function
(1)	Product name	This is the product name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.
(4)	Warranty period	This number describes the duration of the warranty period for the computer.
(5)	Model description	This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.

Computer major components



Item	Component	Spare part number
(1)	**Display assembly**, 11.6-in, HD, (1366×768), LED, LVDS, UWVA , ultraslim display (includes display hinge, microphone, webcam, and Windows button)	801799-001
(2a)	**Hinge cover** (includes **hinge cap (2b)**, WWAN antenna cables and transceivers, and WWAN antenna cable shield)	753714-001
(3)	**Keyboard** with backlight (includes backlight cable and keyboard cable):	
	For use in Belgium	716747-A41
	For use in Brazil	716747-201
	For use in Bulgaria	716747-261
	For use in Canada	716747-DB1
	For use in the Czech Republic and Slovakia	716747-FL1
	For use in Denmark	716747-081
	For use in France	716747-051
	For use in Germany	716747-041
	For use in Greece	716747-151
	For use in Hungary	716747-211
	For use in Iceland	716747-DD1
	For use in India	716747-D61
	For use in Israel	716747-BB1
	For use in Italy	716747-061
	For use in Japan	716747-291
	For use in Latin America	716747-161
	For use in the Netherlands	716747-B31
	For use in Northwest Africa	716747-FP1
	For use in Norway	716747-091
	For use in Portugal	716747-131
	For use in Romania	716747-271
	For use in Russia	716747-251
	For use in Saudi Arabia	716747-171
	For use in Slovenia	716747-BA1
	For use in South Korea	716747-AD1
	For use in Spain	716747-071
	For use in Sweden and Finland	716747-B71
	For use in Switzerland	716747-BG1
	For use in Taiwan	716747-AB1
	For use in Thailand	716747-281

Item	Component	Spare part number
	For use in Turkey	716747-141
	For use in the United Kingdom and Singapore	716747-031
	For use in the United States	716747-001
(4)	**Top cover** (includes NFC antenna)	804355-001
(5)	**System board** (includes processor and replacement thermal material):	
	Equipped with an Intel Core i7-5600U 2.60-GHz (SC turbo up to 3.20-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801797-601
	Equipped with an Intel Core i7-5600U 2.60-GHz (SC turbo up to 3.20-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801797-501
	Equipped with an Intel Core i7-5600U 2.60-GHz (SC turbo up to 3.20-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801797-001
	Equipped with an Intel Core i7-5500U 2.40-GHz (SC turbo up to 3.00-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801796-601
	Equipped with an Intel Core i7-5500U 2.40-GHz (SC turbo up to 3.00-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801796-501
	Equipped with an Intel Core i7-5500U 2.40-GHz (SC turbo up to 3.00-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801796-001
	Equipped with an Intel Core i5-5300U 2.30-GHz (SC turbo up to 2.90-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801795-601
	Equipped with an Intel Core i5-5300U 2.30-GHz (SC turbo up to 2.90-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801795-501
	Equipped with an Intel Core i5-5300U 2.30-GHz (SC turbo up to 2.90-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801795-001
	Equipped with an Intel Core i5-5200U 2.20-GHz (SC turbo up to 2.70-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801794-001
	Equipped with an Intel Core i5-5200U 2.20-GHz (SC turbo up to 2.70-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801794-501
	Equipped with an Intel Core i5-5200U 2.20-GHz (SC turbo up to 2.70-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801794-601
	Equipped with an Intel Core i3-5010U 2.10-GHz processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801793-601
	Equipped with an Intel Core i3-5010U 2.10-GHz processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801793-501
	Equipped with an Intel Core i3-5010U 2.10-GHz processor (3.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801793-001
(6)	**Fan/heat sink assembly** (includes replacement thermal material)	801798-001
(7)	**RTC battery** (includes cable and double-sided adhesive)	716742-001
(8)	**Bottom cover** (includes battery release latch)	753715-001
(9)	**Power Button board** (includes cable)	753718-001
(10)	**Speaker Kit** (includes left and right speakers and cables)	753719-001
(11)	**NFC board** (includes cable)	801800-001

Item	Component	Spare part number
(12)	**Solid-state drive:**	
	512-MB, M2, SATA-3	796427-001
	256-MB, M2, SATA-3	804358-001
	256-MB, M2, SATA-3, SED, Opal 2	785503-001
	256-MB, M2, SATA-3, TLC	804361-001
	180-MB, M2, SATA-3	753730-001
	180-MB, M2, SATA-3, SED, Opal 2	804357-001
	128-MB, M2, SATA-3	804356-001
	128-MB, M2, SATA-3, TLC	804360-001
(13)	**Memory module** (PC3L, 12800, 1600):	
	8-GB	693374-001
	4-GB	691740-001
(14)	**WWAN module:**	
	HP hs3110 HSPA+ Mobile Broadband Module	793516-001
	HP lt4211 LTE/EV-DO/HSPA+ Gobi 4G Module	793116-001
	HP lt4112 LTE/HSPA+ Gobi 4G Module	790198-001
(15)	**WLAN module:**	
	11ac+BT4 2x2 PCIe+USB NGFF INDO	783721-001
	Intel Dual Band Wireless-N 7265AN 802.11 a/b/g/n 2×2 WiFi + BT 4.0 Combo Adapter	756748-001
(16)	**Service cover** (includes 6 captive retention screws and 2 rubber feet)	753713-001
	Plastics/Rubber Kit (not illustrated, includes 4 service cover rubber screw covers)	716744-001
(17)	**6-cell, 44-Wh, 1.98-Ah, Li-ion battery** (includes rubber feet and speaker grilles)	698943-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
65-W HP Smart AC adapter (RC, V, EM, 3-wire)	693710-001
45-W HP Smart AC adapter (non-PFV, RC, 3-wire)	744893-001
Power cord (3-pin, black, 1.83-m):	
For use in Argentina	490371-D01
For use in Australia	490371-011
For use in Brazil	490371-202
For use in Denmark	490371-081

Component	Spare part number
For use in Europe	490371-021
For use in India	490371-D61
For use in Israel	490371-BB1
For use in Italy	490371-061
For use in Japan	490371-291
For use in North America	490371-001
For use in the People's Republic of China	490371-AA1
For use in South Africa	490371-AR1
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Taiwan	490371-AB1
For use in Thailand	490371-201
For use in the United Kingdom and Singapore	490371-031
Power cord (3-pin, black, 1.00-m):	
For use in Argentina	755530-D01
For use in Australia	755530-011
For use in Brazil	755530-202
For use in Denmark	755530-081
For use in Europe	755530-021
For use in India	755530-D61
For use in Israel	755530-BB1
For use in Italy	755530-061
For use in Japan	755530-291
For use in North America	755530-001
For use in the People's Republic of China	755530-AA1
For use in South Africa	755530-AR1
For use in South Korea	755530-AD1
For use in Switzerland	755530-111
For use in Taiwan	755530-AB1
For use in Thailand	755530-201
For use in the United Kingdom and Singapore	755530-031
Screw Kit	753731-001

4 Removal and replacement procedures preliminary requirements

Tools required

You will need the following tools to complete the removal and replacement procedures:

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers

Service considerations

The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

NOTE: As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

CAUTION: Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic

Cables and connectors

⚠ **CAUTION:** When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

⚠ **CAUTION:** Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE.”

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

⚠ **CAUTION:** To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

⚠ **CAUTION:** A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels

	Relative humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

Material	Use	Voltage protection level
Antistatic plastics	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5 Removal and replacement procedures for Customer Self-Repair parts

NOTE: The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

Component replacement procedures

NOTE: Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer.

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

There are as many as 11 screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Battery

Description	Spare part number
6 cell, 44-Wh, 1.98-Ah, Li-ion battery (includes rubber feet and speaker grilles)	698943-001

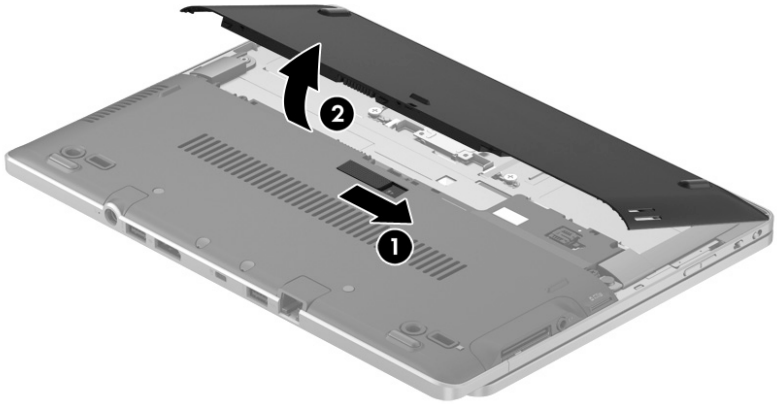
Before disassembling the computer, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the battery:

1. Turn the computer upside down with the rear toward you.
2. Slide the battery release latch **(1)** to release the battery.

3. Pivot the battery up and back and then remove the battery **(2)**.



Reverse this procedure to install the battery.

Service cover

Description	Spare part number
Service cover (includes 6 captive retention screws and 2 rubber feet)	753713-001

Before removing the service cover, follow these steps:

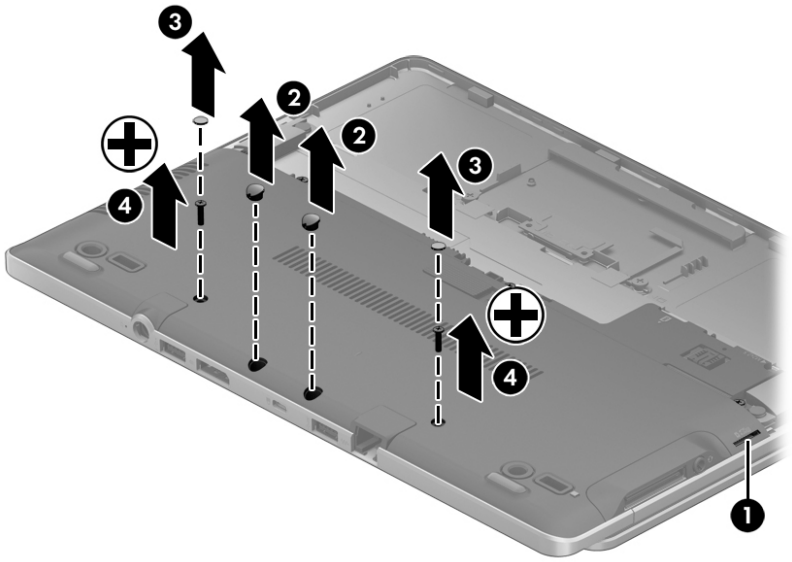
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).

Remove the service cover:

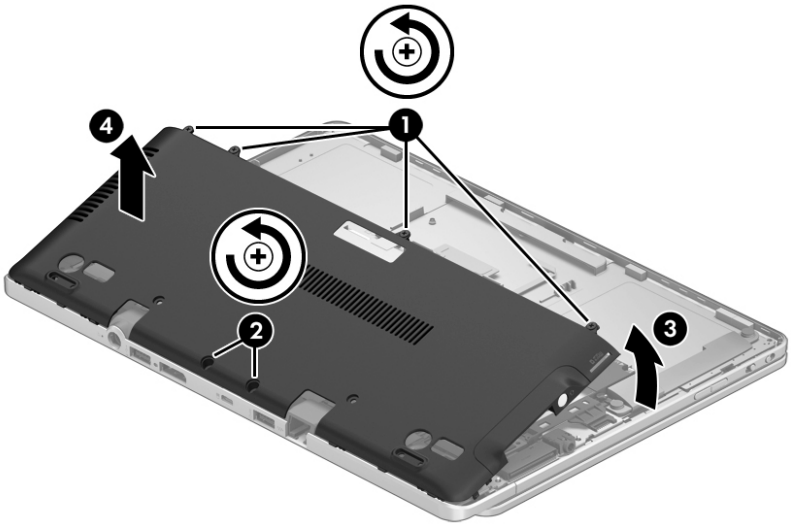
1. Press on the memory card bezel **(1)** once to release the bezel, and then press on the bezel again to remove the bezel.
2. Remove the two large rubber screw covers **(2)**.
3. Remove the two small rubber screw covers **(3)**.

   The large and small rubber screw covers are included in the Plastics/Rubber Kit, spare part number 716744-001.

4. Remove the two Phillips PM2.0×8.5 screws **(4)** that secure the service cover to the computer.



5. Loosen the four captive Phillips screws **(1)** on the front edge of the service cover.
6. Loosen the two captive Phillips screws **(2)** on the rear edge of the service cover.
7. Lift the front edge of the service cover **(3)** until the cover detaches from the computer, and then remove the service cover **(4)** from the computer.



Reverse this procedure to install the service cover.

WWAN module

Description	Spare part number
HP hs3110 HSPA+ Mobile Broadband Module	793516-001
HP lt4211 LTE/EV-DO/HSPA+ Gobi 4G Module	793116-001
HP lt4112 LTE/HSPA+ Gobi 4G Module	790198-001

⚠ **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact technical support.

Before removing the WWAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).
5. Remove the service cover (see Service cover on page 26).

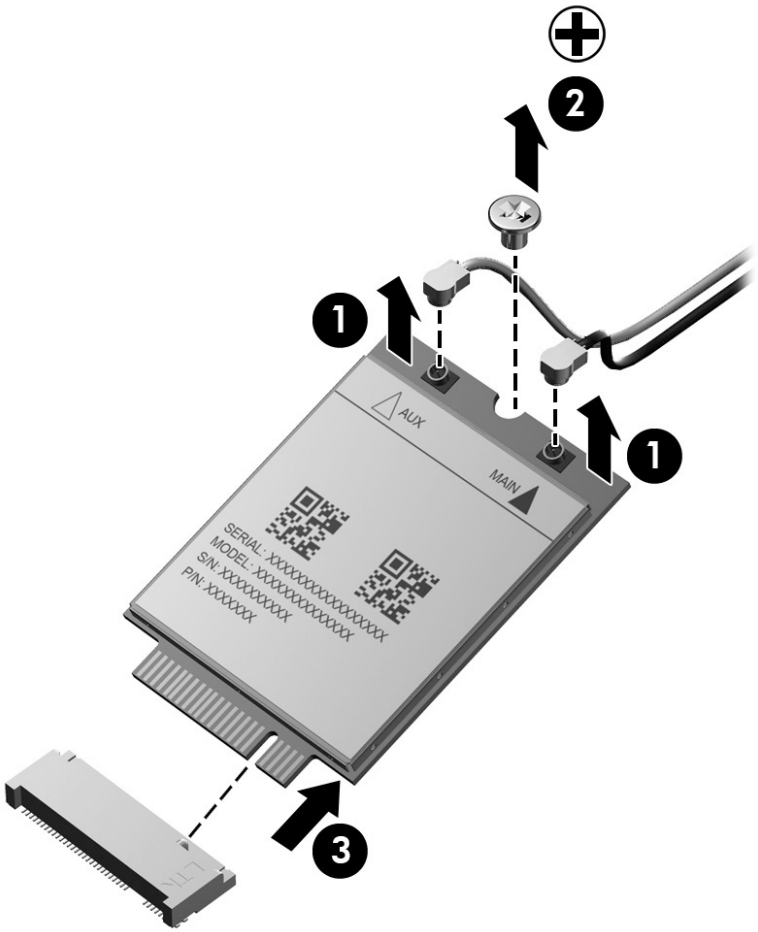
Remove the WWAN module:

1. Disconnect the WWAN antenna cables **(1)** from the terminals on the WWAN module.

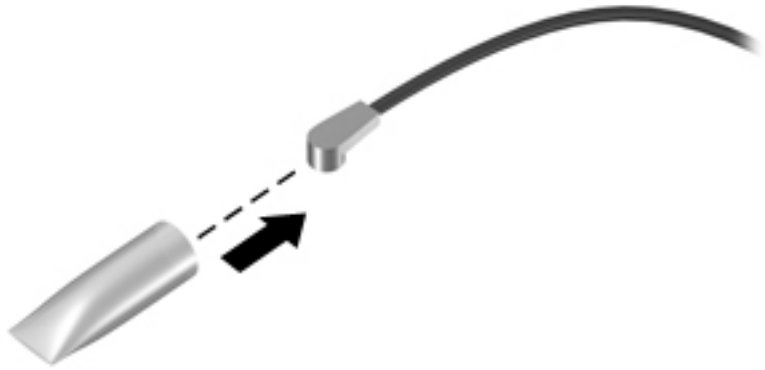
   NOTE: The WWAN antenna cable labeled “5/MAIN” connects to the WWAN module “Main” terminal. The WWAN antenna cable labeled “6/AUX” connects to the WWAN module “Aux” terminal.

2. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the WWAN module to the computer. (The WWAN module tilts up.)

3. Remove the WWAN module **(3)** by pulling the module away from the slot at an angle.



NOTE: If the WWAN antenna cables are not connected to the WWAN module terminal, the protective sleeves should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WWAN module.

WLAN module

Description	Spare part number
11ac+BT4 2x2 PCIe+USB NGFF INDO	783721-001
Intel Dual Band Wireless-N 7265AN 802.11 a/b/g/n 2×2 WiFi + BT 4.0 Combo Adapter	756748-001

CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact technical support.

Before removing the WLAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).
5. Remove the service cover (see Service cover on page 26).

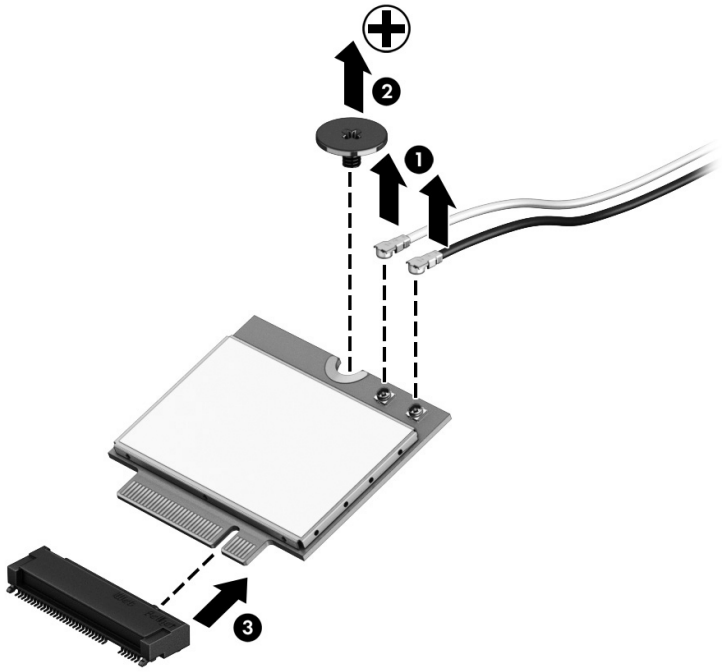
Remove the WLAN module:

1. Disconnect the WLAN connector from the computer.
2. Disconnect the WLAN antenna cables **(1)** from the WLAN module terminals.

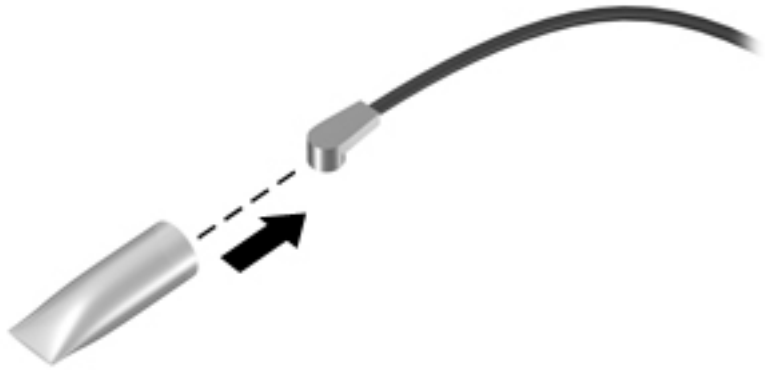
NOTE: The WLAN antenna cable labeled “1/MAIN” connects to the WLAN module “Main” terminal. The WLAN antenna cable labeled “2/AUX” connects to the WLAN module “Aux” terminal.

3. Remove the Phillips PM2.0×2.5 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

4. Remove the WLAN module **(3)** by pulling the module away from the connection at an angle.



NOTE: If the WLAN antennas are not connected to the WLAN module, the protective sleeve should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

Solid-state drive

Description	Spare part number
512-MB, M2, SATA-3	796427-001
256-MB, M2, SATA-3	804358-001
256-MB, M2, SATA-3, SED, Opal 2	785503-001
256-MB, M2, SATA-3, TLC	804361-001
180-MB, M2, SATA-3	753730-001
180-MB, M2, SATA-3, SED, Opal 2	804357-001
128-MB, M2, SATA-3	804356-001
128-MB, M2, SATA-3, TLC	804360-001

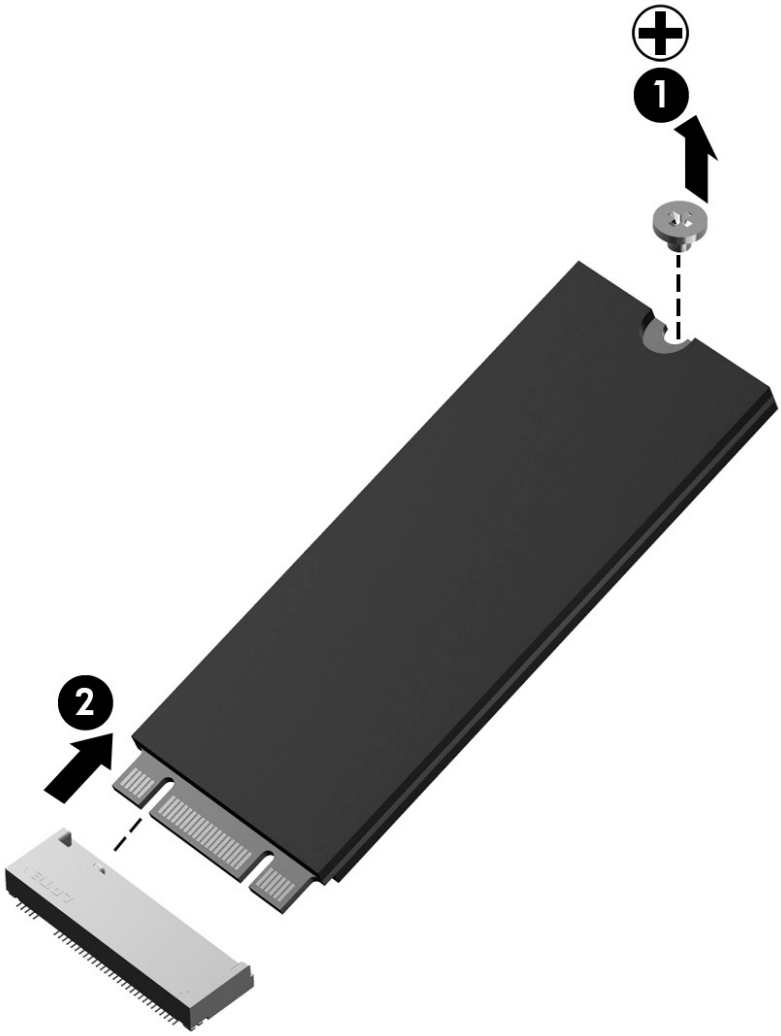
Before removing the solid-state drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).
5. Remove the service cover (see Service cover on page 26).

Remove the solid-state drive:

1. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the solid-state drive to the computer. (The solid-state drive tilts up.)

2. Remove the solid-state drive **(2)** by pulling the drive away from the slot at an angle.



Reverse this procedure to install the solid-state drive.

Memory module

Description	Spare part number
8 GB memory module (PC3, 12800, 1600)	693374-001
4 GB memory module PC3L 12800 1600)	691740-001

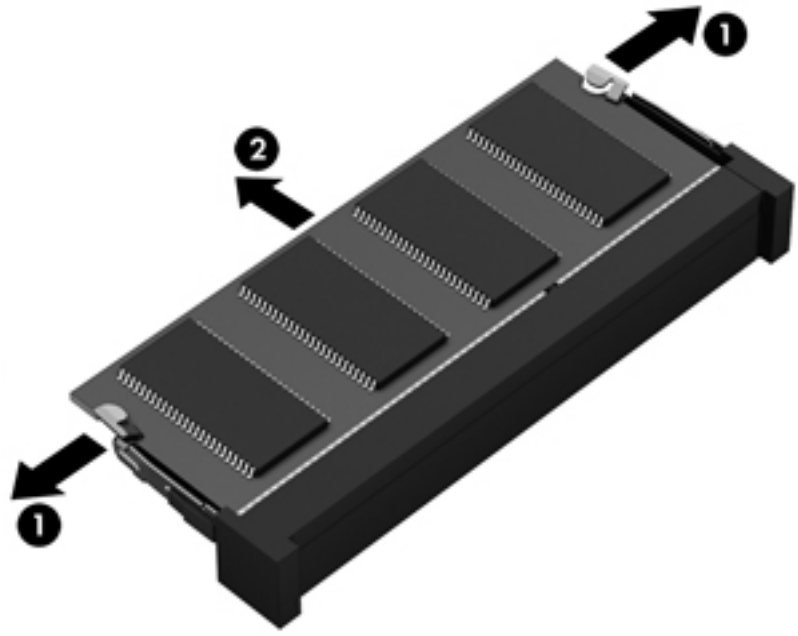
Before removing a memory module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).
5. Remove the service cover (see Service cover on page 26).

Remove the memory module:

NOTE: Note the location of the memory module. If you are replacing it, install the new memory module in the same slot.

1. Spread the two retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)
2. Remove the memory module **(2)** by pulling it away from the slot at a 45 degree angle.



Reverse this procedure to install the memory module.

6 Removal and replacement procedures for Authorized Service Provider parts

CAUTION: Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

Component replacement procedures

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Bottom on page 13 for details.

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

There are as many as 32 screws that must be removed, replaced, and/or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Unlocking the device and disabling Always On Remote Management (select HP devices only)

HP Touchpoint Manager (HPTM) is a complete cloud-based solution for managing devices. For select HP devices with the Windows operating system, the Always On Remote Management (AORM) feature is automatically activated when HP Touchpoint Manager software is installed.

AORM can perform a secure BIOS level lock and can also securely erase internal drives (except for encrypted self-encrypting drives). The HP Touchpoint Manager website (http://www.hptouchpointmanager.com) provides access to the AORM lock feature. The device must be unlocked using an authorized PIN from the same website before you can access HP Computer Setup and start the Windows operating system.

IMPORTANT: A service agent cannot retrieve the PIN from the HP Touchpoint Manager website. If a locked device is returned for service, the agent must contact the customer to obtain the PIN to unlock the device. If a PIN is not available, the entire system board must be replaced.

Before returning the device for service, be sure to unlock the device using the PIN from the HP Touchpoint Manager website (http://www.hptouchpointmanager.com), and also disable the AORM feature in HP Computer Setup.

To disable AORM:

1. Access HP Computer Setup (F10).
   a. Turn on or restart the device, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
   b. Press f10 to enter Computer Setup.

      NOTE: If the BIOS is protected with an Administrator password, enter the password.
2. Select **Advanced**, and then select **HP Touchpoint Manager Options**.

3. Clear the **Allow Activation** check box.
4. Select **Save changes and exit**.

NFC board

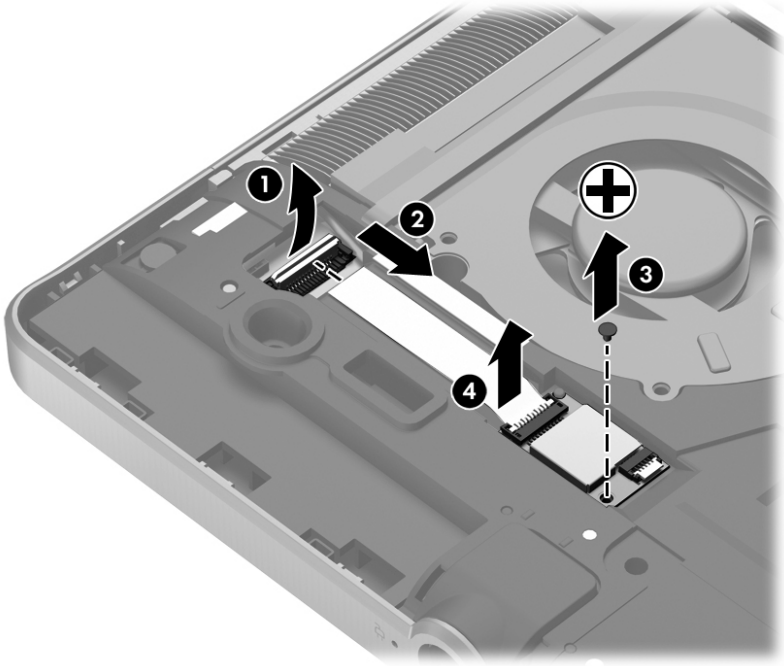
Description	Spare part number
NFC board (includes NFC board cable)	801800-001

Before removing the NFC board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).
5. Remove the service cover (see Service cover on page 26).

Remove the NFC board:

1. Release the zero insertion force (ZIF) connector **(1)** to which the NFC board cable is attached, and then disconnect the NFC board cable from the NFC board **(2)**.
2. Remove the Phillips M1.5×2.0 screw **(3)** that secures the NFC board to the bottom cover.
3. Detach the NFC board **(4)** from the bottom cover. (The NFC board is attached to the bottom cover with double-sided tape.)



4. Remove the NFC board and cable.

Reverse this procedure to install the NFC board and cable.

Keyboard

NOTE: The keyboard spare part kit includes a backlight cable and keyboard cable.

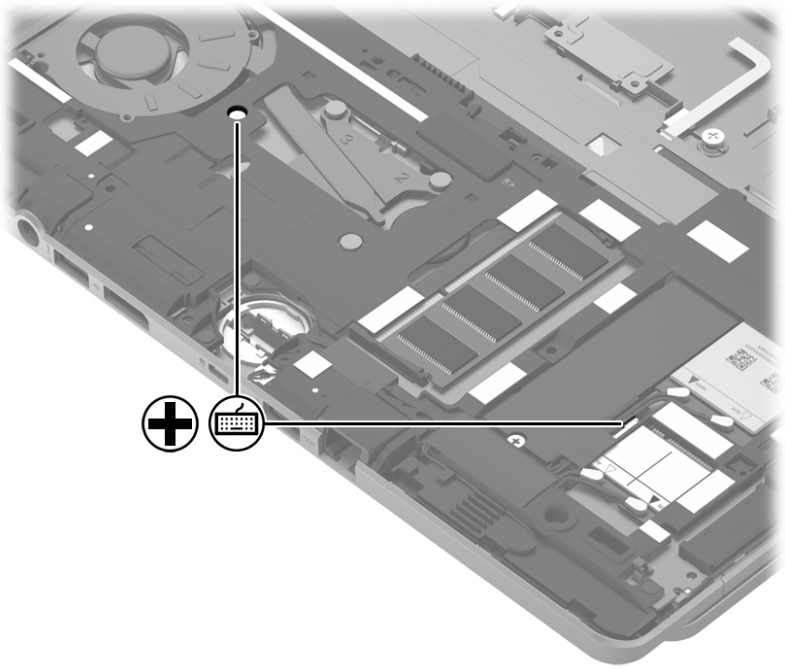
For use in country/region	Spare part number	For use in country/region	Spare part number
For use in Belgium	716747-A41	For use in Norway	716747-091
For use in Brazil	716747-201	For use in Northwest Africa	716747-FP1
For use in Bulgaria	716747-261	For use in Portugal	716747-131
For use in Canada	716747-DB1	For use in Romania	716747-271
For use in the Czech Republic and Slovakia	716747-FL1	For use in Russia	716747-251
For use in Denmark	716747-081	For use in Saudi Arabia	716747-171
For use in France	716747-051	For use in Slovenia	716747-BA1
For use in Germany	716747-041	For use in South Korea	716747-AD1
For use in Greece	716747-151	For use in Spain	716747-071
For use in Hungary	716747-211	For use in Sweden and Finland	716747-B71
For use in Iceland	716747-DD1	For use in Switzerland	716747-BG1
For use in India	716747-D61	For use in Taiwan	716747-AB1
For use in Israel	716747-BB1	For use in Thailand	716747-281
For use in Italy	716747-061	For use in Turkey	716747-141
For use in Japan	716747-291	For use in the United Kingdom and Singapore	716747-031
For use in Latin America	716747-161	For use in the United States	716747-001
For use in the Netherlands	716747-B31		

Before removing the keyboard, follow these steps:

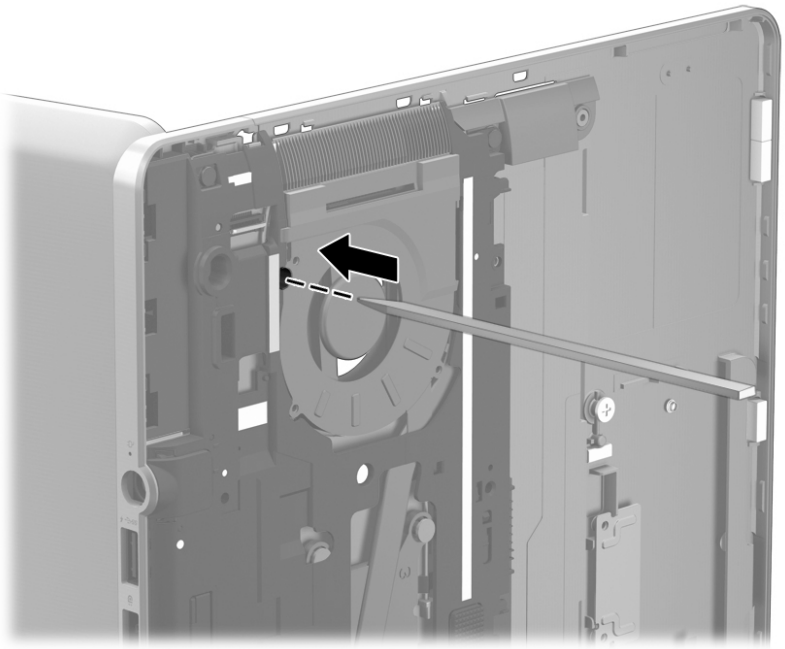
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).
5. Remove the service cover (see Service cover on page 26).

Remove the keyboard:

1. Loosen the 2 captive screws that secure the keyboard to the computer.



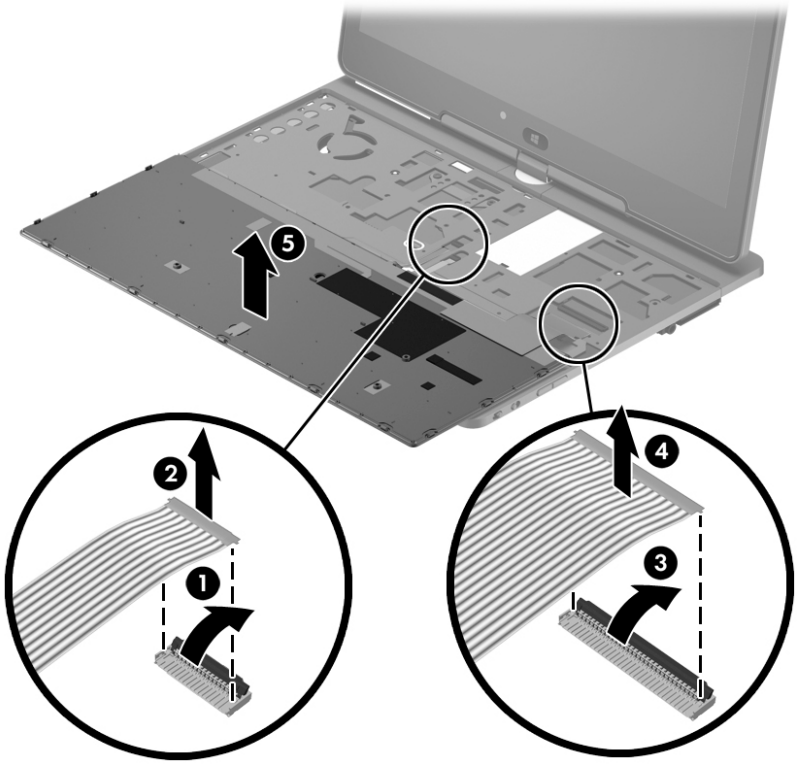
2. Partially open the computer.
3. Rest and secure the computer on its left side.
4. Insert a keyboard release tool or similar thin, plastic tool into the keyboard release hole near the fan, and then press on the back of the keyboard until the keyboard disengages from the computer.



5. Turn the computer right-side up with the front toward you.

6. Lift the rear edge of the keyboard, and then swing the keyboard up and forward until it rests upside down on the palm rest.

7. Release the ZIF connector **(1)** to which the backlight cable is attached, and then disconnect the backlight cable **(2)** from the system board.
8. Release the ZIF connector **(3)** to which the keyboard cable is attached, and then disconnect the keyboard cable **(4)** from the system board.
9. Remove the keyboard **(5)**.



Reverse this procedure to install the keyboard.

Bottom cover

Description	Spare part number
Bottom cover (includes battery release latch)	753715-001

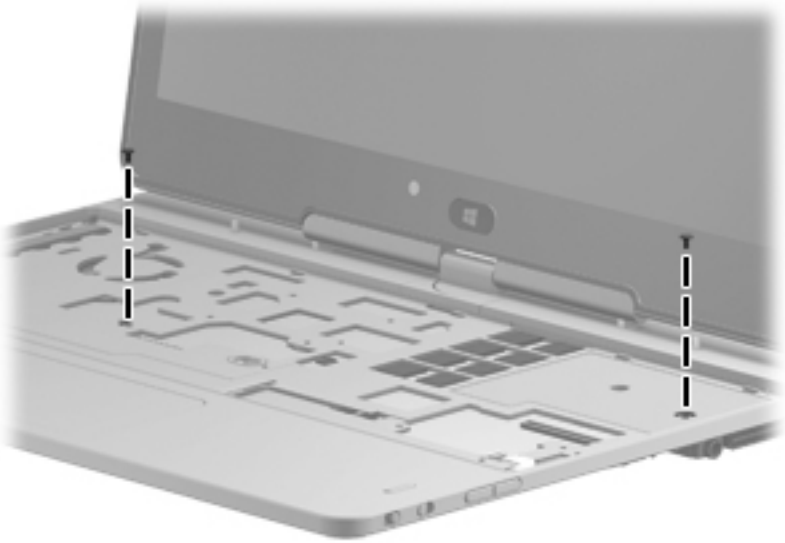
Before removing the bottom cover, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25).
5. Remove the service cover (see Service cover on page 26).
6. Remove the keyboard (see Keyboard on page 37).

NOTE: When replacing the bottom cover, be sure that the NFC board is removed from the defective bottom cover and installed on the replacement bottom cover. See NFC board on page 36 for NFC board removal instructions.

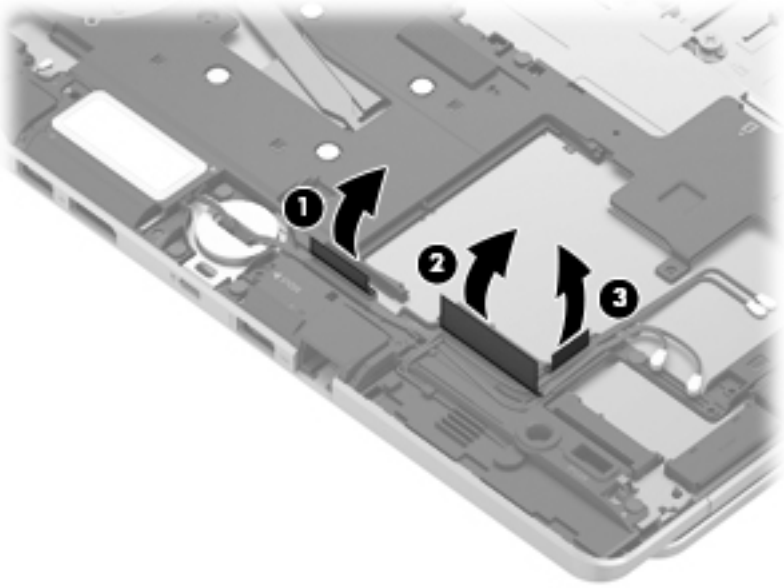
Remove the bottom cover:

1. Remove the two Phillips PM2.0×4.4 screws that secure the bottom cover to the computer.



2. Close the computer.
3. Turn the computer upside down, with the rear toward you.

4. Release the tape **(1)**, **(2)**, and **(3)** that secures the wireless antenna cables.

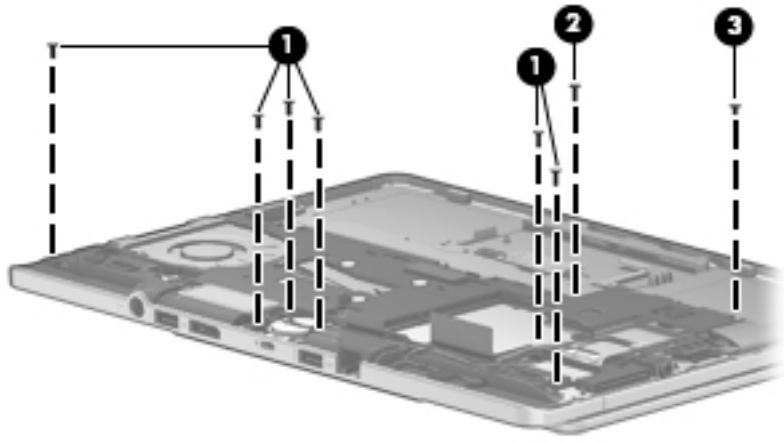


5. Remove the following screws that secure the bottom cover to the computer:

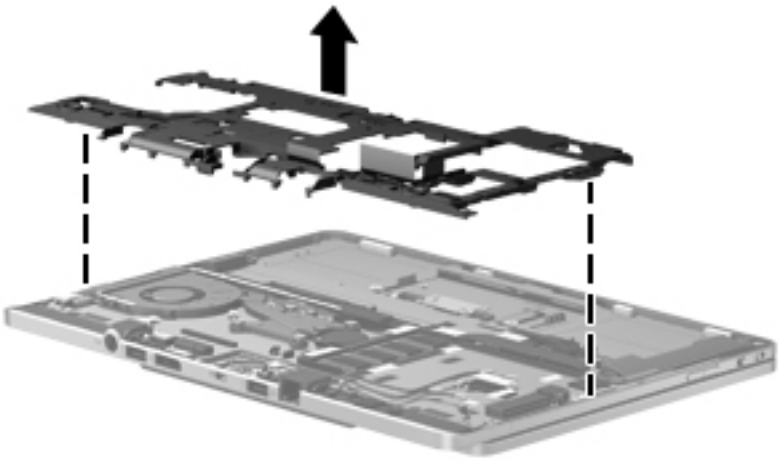
   (1) Six Torx T8M2.0×5.6 screws

   (2) One Torx T8M2.0×3.2 screw

   (3) One Phillips PM2.0×2.3 broad head screw



6. Remove the bottom cover.



Reverse this procedure to install the bottom cover.

Speakers

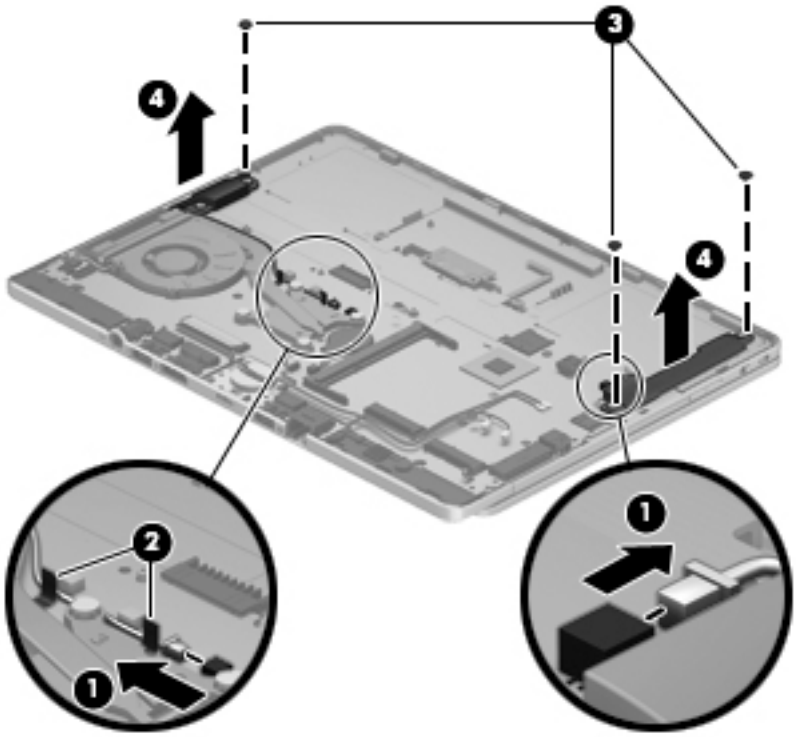
Description	Spare part number
Speaker Kit (includes left and right speakers and cables)	753719-001

Before removing the speakers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25), and then remove the following components:
   a. Service cover (see Service cover on page 26)
   b. Keyboard (see Keyboard on page 37)
   c. Bottom cover (see Bottom cover on page 40)

Remove the speakers:

1. Disconnect the speaker cables **(1)** from the system board.
2. Release the tape **(2)** that secures the left speaker cable.
3. Remove the three Phillips PM2.0×2.3 broad head screws **(3)** that secure the speakers to the top cover.
4. Remove the speakers **(4)**.



Reverse this procedure to install the speakers.

Power button board

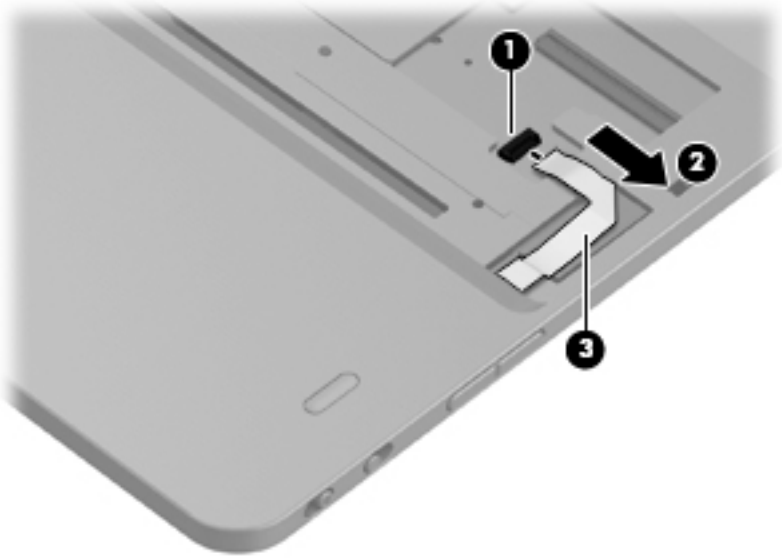
Description	Spare part number
Power button board (includes cable)	753718-001

Before removing the power button board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25), and then remove the following components:
   a. Service cover (see Service cover on page 26)
   b. Keyboard (see Keyboard on page 37)
   c. Bottom cover (see Bottom cover on page 40)
   d. Right speaker (see Speakers on page 43)

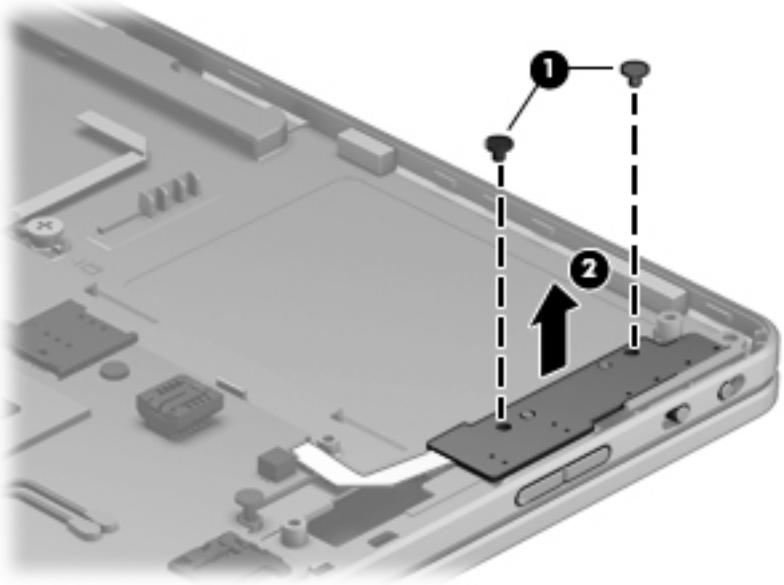
Remove the power button board:

1. Turn the computer right side up, with the front toward you.
2. Open the computer.
3. Release the ZIF connector **(1)** to which the power button board cable is attached, and then disconnect the power button board cable **(2)** from the system board.
4. Detach the power button board **(3)** from the bottom cover. (The button board cable is attached to the bottom cover with double-sided tape.)



5. Close the computer.
6. Turn the computer upside down, with the rear toward you.

7. Remove the two Phillips PM2.0×2.9 screws **(1)** that secure the power button board to the bottom cover.
8. Remove the power button board **(2)**.



Reverse this procedure to install the power button board.

RTC battery

Description	Spare part number
RTC battery (includes cable and double-sided adhesive)	716742-001

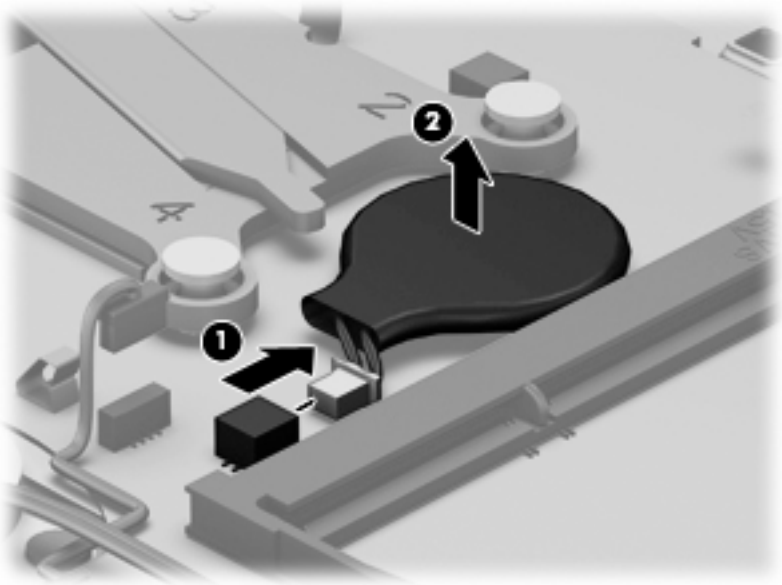
Before removing the RTC battery, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25), and then remove the following components:
   a. Service cover (see Service cover on page 26)
   b. Keyboard (see Keyboard on page 37)
   c. Bottom cover (see Bottom cover on page 40)

Remove the RTC battery:

1. Disconnect the RTC battery cable **(1)** from the system board.

2. Detach the RTC battery **(2)** from the bottom cover. (The RTC battery is attached to the system board with double-sided tape.)



3. Remove the RTC battery.

Reverse this procedure to install the RTC battery.

System board

Description	Spare part number
Equipped with an Intel Core i7-5600U 2.60-GHz (SC turbo up to 3.20-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801797-601
Equipped with an Intel Core i7-5600U 2.60-GHz (SC turbo up to 3.20-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801797-501
Equipped with an Intel Core i7-5600U 2.60-GHz (SC turbo up to 3.20-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801797-001
Equipped with an Intel Core i7-5500U 2.40-GHz (SC turbo up to 3.00-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801796-601
Equipped with an Intel Core i7-5500U 2.40-GHz (SC turbo up to 3.00-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801796-501
Equipped with an Intel Core i7-5500U 2.40-GHz (SC turbo up to 3.00-GHz) processor (4.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801796-001
Equipped with an Intel Core i5-5300U 2.30-GHz (SC turbo up to 2.90-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801795-601
Equipped with an Intel Core i5-5300U 2.30-GHz (SC turbo up to 2.90-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801795-501
Equipped with an Intel Core i5-5300U 2.30-GHz (SC turbo up to 2.90-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801795-001
Equipped with an Intel Core i5-5200U 2.20-GHz (SC turbo up to 2.70-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801794-001

Description	Spare part number
Equipped with an Intel Core i5-5200U 2.20-GHz (SC turbo up to 2.70-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801794-501
Equipped with an Intel Core i5-5200U 2.20-GHz (SC turbo up to 2.70-GHz) processor (3.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801794-601
Equipped with an Intel Core i3-5010U 2.10-GHz processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Professional operating system	801793-601
Equipped with an Intel Core i3-5010U 2.10-GHz processor (3.0-MB L3 cache, dual core, 15-W) and the Windows 8 Standard operating system	801793-501
Equipped with an Intel Core i3-5010U 2.10-GHz processor (3.0-MB L3 cache, dual core, 15-W) and a non-Windows 8 operating system	801793-001

Before removing the system board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25), and then remove the following components:
   a. Service cover (see Service cover on page 26)
   b. Solid-state drive (see Solid-state drive on page 32)
   c. Keyboard (see Keyboard on page 37)
   d. Bottom cover (see Bottom cover on page 40)
   e. Right speaker (see Speakers on page 43)

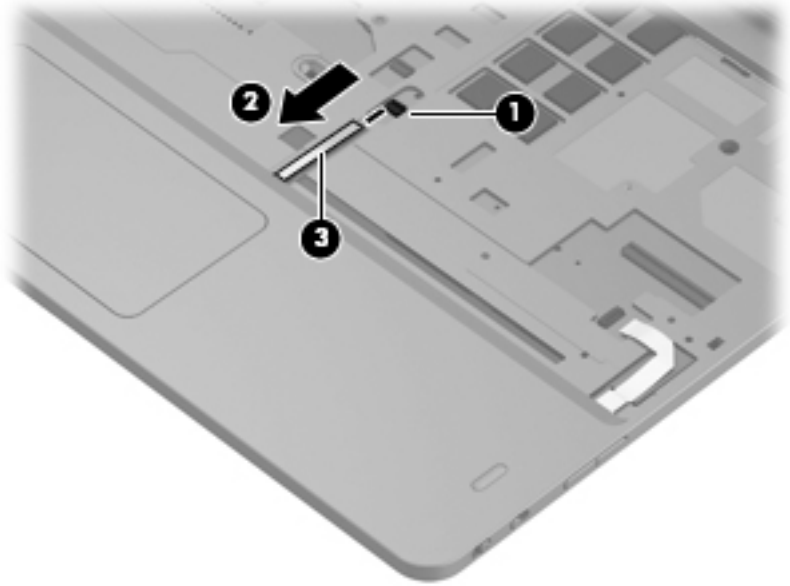
NOTE: When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- WWAN module (see WWAN module on page 28)
- WLAN module (see WLAN module on page 30)
- Memory module (see Memory module on page 34)
- RTC battery (see RTC battery on page 45)
- Fan/heat sink assembly (see Fan/heat sink assembly on page 49)

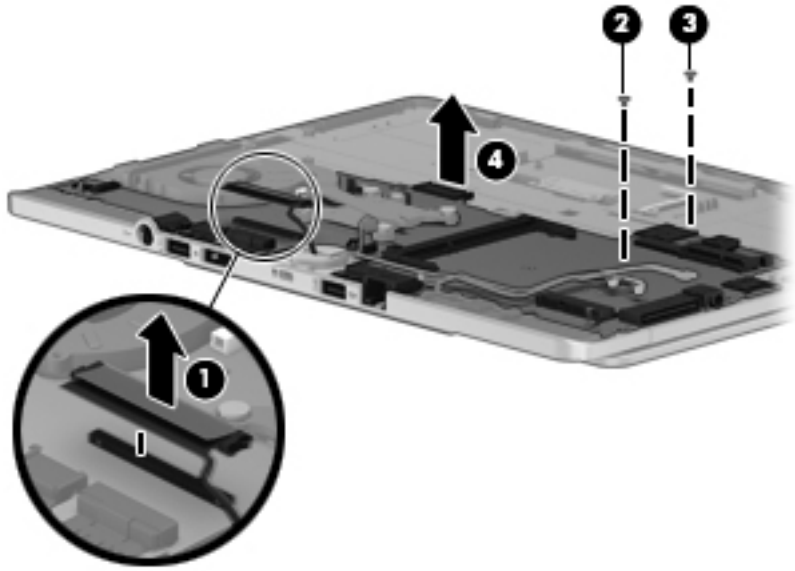
Remove the system board:

1. Turn the computer right side up, with the front toward you.
2. Open the computer.
3. Release the ZIF connector **(1)** to which the TouchPad cable is attached, and then disconnect the TouchPad cable **(2)** from the system board.

4. Detach the TouchPad cable **(3)** from the bottom cover. (The TouchPad cable is attached to the bottom cover with double-sided tape.)



5. Close the computer.
6. Turn the computer upside down with the rear toward you.
7. Disconnect the display panel cable **(1)** from the system board.
8. Remove the Phillips PPM2.0×2.9 screw **(2)** and the Phillips PPM2.0×2.3 broad head screw **(3)** that secure the system board to the top cover.
9. Remove the system board **(4)**.



Reverse this procedure to install the system board.

Fan/heat sink assembly

Description	Spare part number
Fan/heat sink assembly (includes replacement thermal material)	801798-001

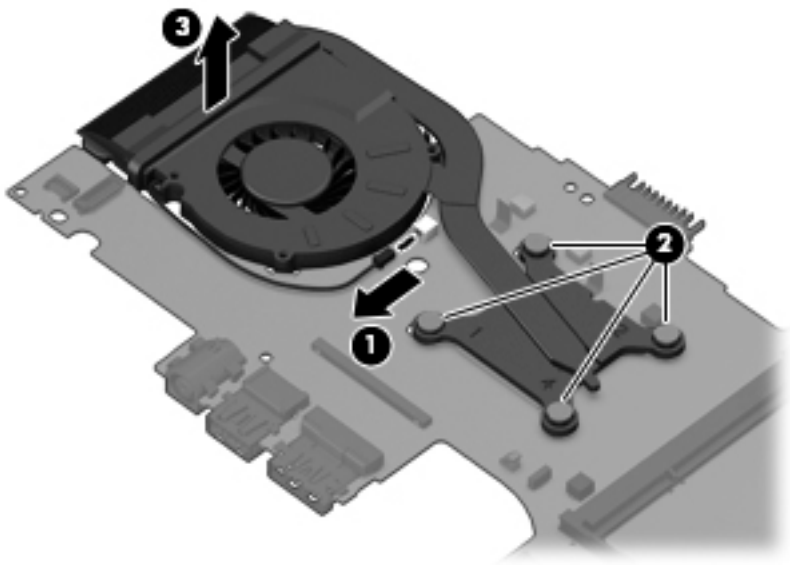
Before removing the fan/heat sink assembly, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25), and then remove the following components:
   a. Service cover (see Service cover on page 26)
   b. Keyboard (see Keyboard on page 37)
   c. Bottom cover (see Bottom cover on page 40)
   d. System board (see System board on page 46)

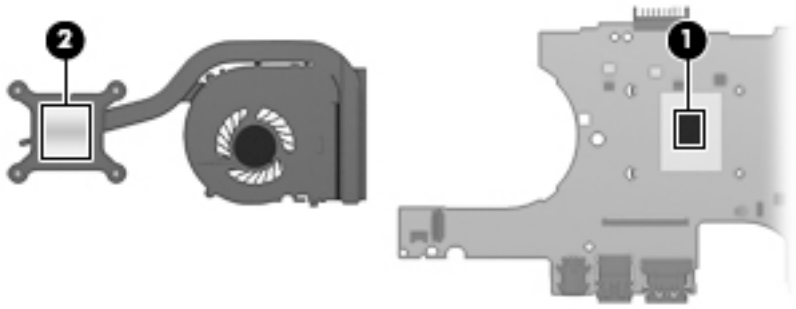
Remove the fan/heat sink assembly:

1. Disconnect the fan cable **(1)** from the system board.
2. Following the 1, 2, 3, 4 sequence stamped into the fan/heat sink assembly, loosen the four captive Phillips PM2.0×6.5 screws **(2)** that secure the fan/heat sink assembly to the system board.
3. Remove the fan/heat sink assembly **(3)**.

NOTE: Due to the adhesive quality of the thermal material located between the fan/heat sink assembly and the system board components, it may be necessary to move the fan/heat sink assembly from side to side to detach it.



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly and the system board each time the fan/heat sink assembly is removed. Replacement thermal material is included with the fan/heat sink assembly and system board spare part kits. Thermal paste is used on the system board **(1)** and the section of the fan/heat sink assembly **(2)** that services it.



Reverse this procedure to install the fan/heat sink assembly.

Hinge cover

Description	Spare part number
Hinge cover (includes hinge cap, WWAN antenna cables and transceivers, and WWAN antenna shield)	753714-001

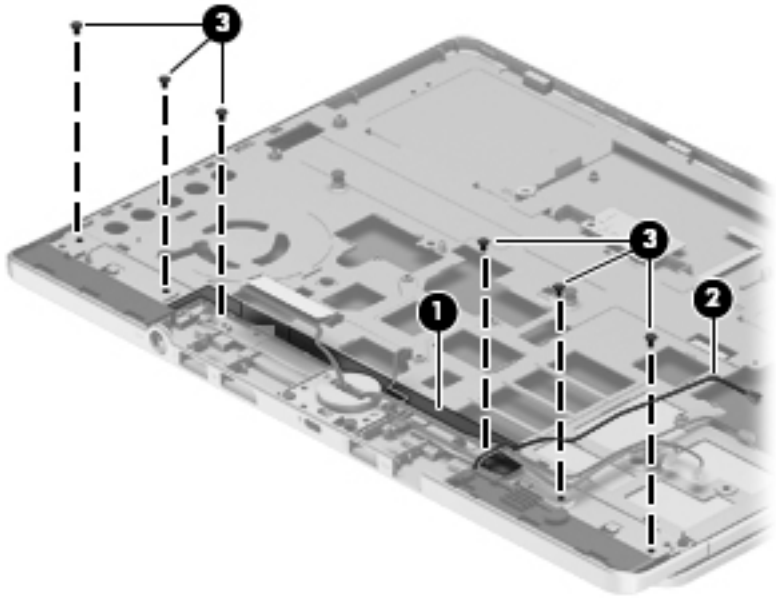
Before removing the hinge cover, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25), and then remove the following components:
   a. Service cover (see Service cover on page 26)
   b. Solid-state drive (see Solid-state drive on page 32)
   c. Keyboard (see Keyboard on page 37)
   d. Bottom cover (see Bottom cover on page 40)
   e. System board (see System board on page 46)

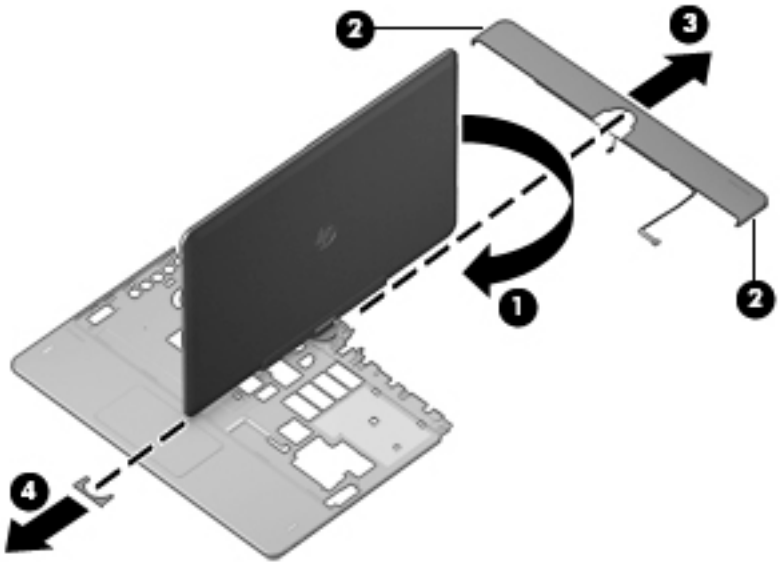
Remove the hinge cover:

1. Remove the shield **(1)** that secures the WWAN antenna cables **(2)** in the routing channel built into the bottom cover.

2. Remove the six Phillips PPM2.0×2.9 screws **(3)** that secure the hinge cover to the bottom cover.



3. Turn the computer right side up, with the front toward you.
4. Open the computer.
5. Rotate the display assembly **(1)** clockwise until it is perpendicular to the computer body.
6. Detach the left **(2)** and right edges of the hinge cover from the computer.
7. Remove the hinge cover **(3)** by sliding it away from the computer.
8. Remove the hinge cap **(4)**.



Reverse this procedure to install the hinge cover and hinge cap.

Display assembly

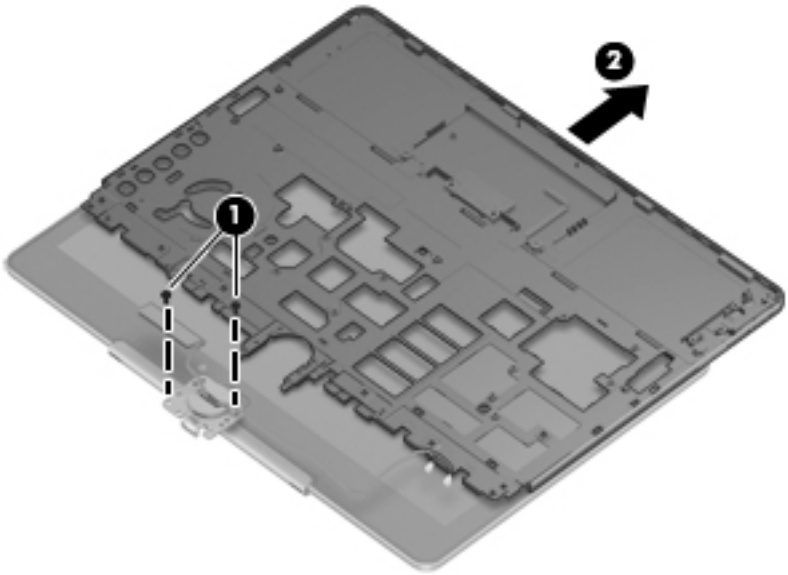
Description	Spare part number
Display assembly, 11.6-in, HD, (1366×768), LED, LVDS, UWVA , ultraslim display (includes display hinge, microphone, webcam, and Windows button)	801799-001

Before removing the display assembly, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 25), and then remove the following components:
   a. Service cover (see Service cover on page 26)
   b. Solid-state drive (see Solid-state drive on page 32)
   c. Keyboard (see Keyboard on page 37)
   d. Bottom cover (see Bottom cover on page 40)
   e. System board (see System board on page 46)
   f. Hinge cover and hinge cap (see Hinge cover on page 50)

Remove the display assembly:

1. Close the computer.
2. Turn the computer right side up with the rear toward you.
3. Remove the two Phillips PPM2.0×4.4 screws **(1)** that secure the display assembly to the bottom cover.
4. Slide the bottom cover **(2)** away from the display assembly.



Reverse this procedure to install the display assembly.

7 Computer Setup (BIOS), MultiBoot, and HP PC Hardware Diagnostics (UEFI) – Windows 8

Using Computer Setup

Computer Setup, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

NOTE: Use extreme care when making changes in Computer Setup. Errors can prevent the computer from operating properly.

Starting Computer Setup

NOTE: An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.

Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

   NOTE: You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

2. Press f10 to enter Computer Setup.
   - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.
   - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
   - To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes:

  Click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **Main > Ignore Changes and Exit**, and then press enter.

- To save your changes and exit Computer Setup menus:

  Click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

  – or –

  Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup

NOTE: Restoring defaults will not change the hard drive mode.

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Main > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

NOTE: Your password settings and security settings are not changed when you restore the factory settings.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be revealed by pressing fn+esc (if you are already in Windows) or by using Computer Setup.

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **Main > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Ignore Changes and Exit**, and then press enter.

Downloading a BIOS update

⚠ **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power on the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

1. From the Start screen, type `support`, and then select the HP Support Assistant app.
2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
   b. Follow the on-screen instructions to download your selection to the hard drive.

      If the update is more recent than your BIOS, make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

NOTE: If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are revealed on the screen after the download is complete. If no instructions are revealed, follow these steps:

1. From the Start screen, type `file`, and then select **File Explorer**.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Using MultiBoot

About the boot device order

As the computer starts, the system attempts to boot from enabled devices. The MultiBoot utility, which is enabled at the factory, controls the order in which the system selects a boot device. Boot devices can include optical drives, diskette drives, a network interface card (NIC), hard drives, and USB devices. Boot devices contain bootable media or files that the computer needs to start and operate properly.

NOTE: Some boot devices must be enabled in Computer Setup before they can be included in the boot order.

You can change the order in which the computer searches for a boot device by changing the boot order in Computer Setup. You can also press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then press f9. Pressing f9 displays a menu that shows the current boot devices and allows you to select a boot device. Or, you can use MultiBoot Express to set the computer to prompt you for a boot location each time the computer turns on or restarts.

Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

- To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.
- To dynamically choose the boot device, by pressing esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then pressing f9 to enter the Boot Device Options menu.
- To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

Setting a new boot order in Computer Setup

To start Computer Setup and set a boot device order that the computer uses each time it is turned on or restarted, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select one of the following options:
   - **Advanced > Boot Options > UEFI Boot Order > UEFI Hybrid**
   - **Advanced > Boot Options > UEFI Boot Order > UEFI Native Boot mode**
   - **Advanced > Boot Options > Legacy Boot Order > Legacy Boot Mode**

   Press enter.
4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the + key.

   – or –

   To move the device down in the boot order, use a pointing device to click the down arrow, or press the - key.
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Dynamically choosing a boot device using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Open the Select Boot Device menu by turning on or restarting the computer, and then pressing esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f9.
3. Use a pointing device or the arrow keys to select a boot device, then press enter.

Setting a MultiBoot Express prompt

To start Computer Setup and set the computer to display the MultiBoot startup location menu each time the computer is started or restarted, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Advanced > Boot Options > MultiBoot Express Boot Popup Delay (Sec)**, and then press enter.
4. In the **MultiBoot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Entering MultiBoot Express preferences

When the Express Boot menu is displayed during startup, you have the following choices:

- To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press enter.
- To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. The computer will not start until you select a boot device and press enter.
- To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press esc, and then press f2.

   The BIOS searches three places for the diagnostic tools, in the following order:

   a. Connected USB drive

   NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 59.

   b. Hard drive

   c. BIOS

2. When the diagnostic tool opens, use the keyboard arrow keys to select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test, press esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

NOTE: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

There are two options to download HP PC Hardware Diagnostics to a USB device:

Option 1: HP PC Diagnostics homepage— Provides access to the latest UEFI version

1. Go to http://hp.com/go/techcenter/pcdiags.
2. Click the **UEFI Download** link, and then select **Run**.

Option 2: Support and Drivers page—Provides downloads for a specific product for earlier and later versions

1. Go to http://www.hp.com.
2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.

3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.

4. Select your computer model, and then select your operating system.
5. In the **Diagnostic** section, click **HP UEFI Support Environment**.

   – or –

   Click **Download**, and then select **Run**.

Using HP Sure Start (select models only)

Select computer models are configured with HP Sure Start, a technology that continuously monitors the computer's BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start automatically restores the BIOS to its previously safe state, without user intervention.

HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

To access the latest documentation on HP Sure Start, go to http://www.hp.com/support, and select your country. Select **Drivers & Downloads**, and then follow the on-screen instructions.

8 Computer Setup (BIOS), MultiBoot, and HP PC Hardware Diagnostics (UEFI) – Windows 7

Using Computer Setup

Computer Setup, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

NOTE: Use extreme care when making changes in Computer Setup. Errors can prevent the computer from operating properly.

Starting Computer Setup

NOTE: An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.

Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

   NOTE: You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

2. Press f10 to enter Computer Setup.
   - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.
   - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
   - To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes:

  Click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **Main > Ignore Changes and Exit**, and then press enter.

- To save your changes and exit Computer Setup menus:

  Click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

  – or –

  Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup

NOTE: Restoring defaults will not change the hard drive mode.

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Main > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

NOTE: Your password settings and security settings are not changed when you restore the factory settings.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be revealed by pressing fn+esc (if you are already in Windows) or by using Computer Setup.

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **Main > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Ignore Changes and Exit**, and then press enter.

Downloading a BIOS update

⚠ **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power on the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

1. Access Help and Support by selecting **Start > Help and Support**.
2. Select **Updates and tune-ups**, and then select **Check for HP updates now**.
3. At the download area, follow these steps:

   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive.

   If the update is more recent than your BIOS, make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

NOTE: If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are revealed on the screen after the download is complete. If no instructions are revealed, follow these steps:

1. Select **Start > Computer**.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Using MultiBoot

About the boot device order

As the computer starts, the system attempts to boot from enabled devices. The MultiBoot utility, which is enabled at the factory, controls the order in which the system selects a boot device. Boot devices can include optical drives, diskette drives, a network interface card (NIC), hard drives, and USB devices. Boot devices contain bootable media or files that the computer needs to start and operate properly.

NOTE: Some boot devices must be enabled in Computer Setup before they can be included in the boot order.

You can change the order in which the computer searches for a boot device by changing the boot order in Computer Setup. You can also press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then press f9. Pressing f9 displays a menu that shows the current boot devices and allows you to select a boot device. Or, you can use MultiBoot Express to set the computer to prompt you for a boot location each time the computer turns on or restarts.

Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

- To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.
- To dynamically choose the boot device, by pressing esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then pressing f9 to enter the Boot Device Options menu.
- To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

Setting a new boot order in Computer Setup

To start Computer Setup and set a boot device order that the computer uses each time it is turned on or restarted, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select the **Legacy Boot Order** list, and then press enter.

4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the + key.

   – or –

   To move the device down in the boot order, use a pointing device to click the down arrow, or press the - key.

5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Dynamically choosing a boot device using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Open the Select Boot Device menu by turning on or restarting the computer, and then pressing esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f9.
3. Use a pointing device or the arrow keys to select a boot device, then press enter.

Setting a MultiBoot Express prompt

To start Computer Setup and set the computer to display the MultiBoot startup location menu each time the computer is started or restarted, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **System Configuration > Boot Options**, and then press enter.
4. In the **MultiBoot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Entering MultiBoot Express preferences

When the Express Boot menu is displayed during startup, you have the following choices:

- To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press enter.
- To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. The computer will not start until you select a boot device and press enter.
- To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

Using HP PC Hardware Diagnostics (UEFI) (select models only)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The tool runs outside of the operating system to isolate hardware failures from issues that may be caused by the operating system or other software components.

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press esc, and then press f2.

   After pressing f2, the BIOS searches three places for the HP PC Hardware Diagnostics (UEFI) tools in the following order:

   a. Connected USB drive

   NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 66.

   b. Hard drive

   c. BIOS

2. Use the keyboard arrow keys to select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test while it is running, press esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

NOTE: The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only.

There are two options to download HP PC Hardware Diagnostics to a USB device:

Option 1: HP PC Diagnostics homepage— Provides access to the latest UEFI version

1. Go to http://hp.com/go/techcenter/pcdiags.
2. Click the **UEFI Download** link, and then select **Run**.

Option 2: Support and Drivers page—Provides downloads for a specific product for earlier and later versions

1. Go to http://www.hp.com.
2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.
3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.

4. Select your computer model, and then select your operating system.
5. In the Diagnostic section, click **HP UEFI Support Environment**.

   – or –

   Click **Download**, and then select **Run**.

9 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	**28.5 cm**	11.22 in
Depth	**21.2 cm**	8.35 in
Height	**2.22 cm**	0.87 in
Weight (equipped with 4-GB memory module, solid-state drive, 6-cell battery, and WLAN module)	**1.40 kg**	3.09 lbs
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W 19.5 V dc @ 2.31A – 45W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.

10 Backup and recovery – Windows 8

To protect your information, use Windows backup and restore utilities to back up individual files and folders, back up your entire hard drive, create system repair media (select models only) by using the installed optical drive (select models only) or an optional external optical drive, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

From the Start screen, type `restore`, click **Settings**, and then select from the list of displayed options.

IMPORTANT: If you will be using **f11 startup recovery** or USB media recovery to recover your system, the tablet battery must have at least 70% battery power remaining before starting the recovery process.

NOTE: For detailed instructions on various backup and restore options, perform a search for these topics in Windows Help and Support.

In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

NOTE: Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. For more information, see Windows Help and Support.

Backing up your information

Recovery after a system failure is as good as your most recent backup. You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

For more information on the Windows backup features, see Windows Help and Support.

Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Automatic Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

NOTE: If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created (select models only), you must purchase Windows operating system media to reboot the computer and repair the operating system. For additional information, see Using Windows operating system media (purchased separately) on page 71.

Using the Windows recovery tools

To recover information you previously backed up, see Windows Help and Support for steps on restoring files and folders.

To recover your information using Automatic Repair, follow these steps:

CAUTION: Some Startup Repair options will completely erase and reformat the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

1. If possible, back up all personal files.
2. If possible, check for the presence of the Recovery Image partition and the Windows partition.

   From the Start screen, type `file`, and then click **File Explorer**.

   – or –

   From the Start screen, type `pc`, and then select **This PC**.

   NOTE: If the Windows partition and the Recovery Image partition are not listed, you must recover your operating system and programs using the Windows operating system DVD and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows operating system media (purchased separately) on page 71.
3. If the Windows partition and the Recovery Image partition are listed, restart the computer by pressing and holding the shift key while clicking **Restart**.
4. Select **Troubleshoot**, then select **Advanced Options**, and then select **Startup Repair**.
5. Follow the on-screen instructions.

NOTE: For additional information on recovering information using the Windows tools, perform a search for these topics in Windows Help and Support.

Using f11 recovery tools

CAUTION: Using f11 completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. The f11 recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using f11:

1. If possible, back up all personal files.
2. If possible, check for the presence of the Recovery Image partition: From the Start screen, type `pc`, and then select **This PC**.

   NOTE: If the Recovery Image partition is not listed, you must recover your operating system and programs using the Windows operating system media and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows operating system media (purchased separately) on page 71.
3. If the Recovery Image partition is listed, restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

4. Press f11 while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

Using Windows operating system media (purchased separately)

To order a Windows operating system DVD, contact support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

CAUTION: Using a Windows operating system media completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate a full install of the operating system using a Windows operating system DVD:

NOTE: This process takes several minutes.

1. If possible, back up all personal files.
2. Insert the Windows operating system DVD into the optical drive, and then restart the computer.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.

After the installation is completed:

1. Eject the Windows operating system media and then insert the *Driver Recovery* media.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

Using Windows Refresh or Windows Reset

When your computer is not working properly and you need to regain system stability, the Windows Refresh option allows you to start fresh and keep what is important to you.

The Windows Reset option allows you to perform detailed reformatting of your computer, or remove personal information before you give away or recycle your computer. For more information on these features, see Windows Help and Support.

Using HP Software Setup

HP Software Setup can be used to reinstall drivers or select software that has been corrupted or deleted from the system.

1. From the Start screen, type `HP Software Setup`.
2. Open HP Software Setup.
3. Follow the on-screen directions to reinstall drivers or select software.

11 Backup and recovery – Windows 7

Your computer includes HP and Windows tools to help you safeguard your information and retrieve it if you ever need to. These tools will help you return your computer to a proper working state, all with simple steps. This section provides information about the following processes:

- Creating recovery media and backups
- Restoring and recovering your system

Creating recovery media and backups

Recovery after a system failure is only as good as your most recent backup.

1. After you successfully set up the computer, create HP Recovery media. This step creates a Windows 7 operating system DVD and a *Driver Recovery* DVD. The Windows DVD can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. The *Driver Recovery* DVD installs specific drivers and applications. See Creating recovery media with HP Recovery Disc Creator on page 73.
2. Use Windows Backup and Recovery tools to perform the following:
   - Back up individual files and folders
   - Back up your entire hard drive (select models only)
   - Create system repair discs (select models only) with the installed optical drive (select models only) or an optional external optical drive
   - Create system restore points

NOTE: This guide describes an overview of backing up, restoring, and recovering options. For more details about the tools provided, see Help and Support. To access Help and Support, select **Start > Help and Support**.

NOTE: HP recommends that you print the recovery procedures and save them for later use, in case of system instability.

In case of system failure, you can use the backup files to restore the contents of your computer. See Backing up your information on page 74.

Guidelines

- When creating recovery media or backing up to discs, use any of the following types of discs (purchased separately): DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive you are using.
- Be sure that the computer is connected to AC power before you start the recovery media creation process or the backup process.

Creating recovery media with HP Recovery Disc Creator

HP Recovery Disc Creator is a software program that offers an alternative way to create recovery media. After you successfully set up the computer, you can create recovery media using HP Recovery Disc Creator. This recovery media allows you to reinstall your original operating system as well as select drivers and

applications if the hard drive becomes corrupted. HP Recovery Disc Creator can create two kinds of recovery DVDs:

- Windows 7 operating system DVD—Installs the operating system without additional drivers or applications.
- *Driver Recovery* DVD—Installs specific drivers and applications only, in the same way that the HP Software Setup utility installs drivers and applications.

Creating recovery media

NOTE: The Windows 7 operating system DVD can be created only once. Thereafter, the option to create that media will not be available after you create a Windows DVD.

To create the Windows DVD:

1. Select **Start > All Programs > Productivity and Tools > HP Recovery Disc Creator**.
2. Select **Windows disk**.
3. From the drop-down menu, select the drive for burning the recovery media.
4. Click the **Create** button to start the burning process.

After the Windows 7 operating system DVD has been created, create the *Driver Recovery* DVD:

1. Select **Start > All Programs > Productivity and Tools > HP Recovery Disc Creator**.
2. Select **Driver disk**.
3. From the drop-down menu, select the drive for burning the recovery media.
4. Click the **Create** button to start the burning process.

Backing up your information

You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. You should also create Windows system repair media (select models only) which can be used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

You can back up your information to an optional external hard drive, a network drive, or discs.

Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated directories.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.
- When backing up to discs, number each disc after removing it from the drive.

NOTE: For detailed instructions on various backup and restore options, perform a search for these topics in Help and Support. To access Help and Support, select **Start > Help and Support**.

NOTE: Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support. To access Help and Support, select **Start > Help and Support**.

To create a backup using Windows Backup and Restore:

NOTE: The backup process may take over an hour, depending on file size and the speed of the computer.

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to set up your backup, create a system image (select models only), or create system repair media (select models only).

Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools (select models only): You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

NOTE: If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created (select models only), you must purchase Windows 7 operating system media to reboot the computer and repair the operating system. For additional information, see Using Windows 7 operating system media on page 76.

Using the Windows recovery tools

Using the Windows recovery tools, you can:

- Recover individual files
- Restore the computer to a previous system restore point
- Recover information using recovery tools

NOTE: For detailed instructions on various recovery and restore options, perform a search for these topics in Help and Support. To access Help and Support, select **Start > Help and Support**.

NOTE: Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support. To access Help and Support, select **Start > Help and Support**.

To recover information you previously backed up:

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to recover your system settings, your computer (select models only), or your files.

To recover your information using Startup Repair, follow these steps:

CAUTION: Some Startup Repair options will completely erase and reformat the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition.

   To check for the Windows partition, select **Start > Computer**.

   NOTE: If the Windows partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* media. For additional information, see Using Windows 7 operating system media on page 76.

3. If the Windows partition is listed, restart the computer, and then press f8 before the Windows operating system loads.
4. Select **Startup Repair**.
5. Follow the on-screen instructions.

NOTE: For additional information on recovering information using the Windows tools, select **Start > Help and Support**.

Using f11 recovery tools (select models only)

CAUTION: Using f11 completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. The f11 recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using f11:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition: click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

   NOTE: If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system media and the *Driver Recovery* media. For additional information, see Using Windows 7 operating system media on page 76.

3. If the HP Recovery partition is listed, restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press f11 while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

Using Windows 7 operating system media

If you cannot use the recovery media you previously created using the HP Recovery Disc Creator (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system.

To order a Windows 7 operating system DVD, go to the HP website. For U.S. support, go to http://www.hp.com/support. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html. You can also order the DVD by calling support. For contact information, see the *Worldwide Telephone Numbers* booklet included with the computer.

CAUTION: Using a Windows 7 operating system DVD completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows 7 operating system DVD:

NOTE: This process takes several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 7 operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

After the repair is completed:

1. Eject the Windows 7 operating system DVD and then insert the *Driver Recovery* DVD.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

12 Statement of Volatility

The purpose of this document is to provide general information regarding non-volatile memory in industry-standards based HP Business Notebook PC systems and provide general instructions for restoring nonvolatile memory that can contain personal data after the system has been powered off and the hard drive has been removed.

HP Business Notebook PC products that use Intel-based or AMD®-based system boards contain volatile DDR memory. The amount of nonvolatile memory present in the system depends upon the system configuration. Intel-based and AMD-based system boards contain nonvolatile memory subcomponents as originally shipped from HP assuming that no subsequent modifications have been made to the system and assuming that no applications, features, or functionality have been added to or installed on the system.

Following system shutdown and removal of all power sources from an HP Business Notebook PC system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. The steps below will remove personal data from the notebook PC, including the nonvolatile memory found in Intel-based and AMD-based system boards. Some of these steps are disclosed in the Maintenance and Service Guides available for HP PC products available on the product support pages at www.hp.com.

1. Follow steps (a) through (I) below to restore the nonvolatile memory that can contain personal data. Restoring or re-programming nonvolatile memory that does not store personal data is neither necessary nor recommended.

   a. Enter BIOS (F10) Setup by powering on the system and pressing F10 when prompted near the bottom of the display, or press the ESC key to display the start up menu, then press F10 . If the system has a BIOS administrator password, enter the password at the prompt.

   b. Select the **File** menu, then **Restore Defaults**.

   c. Select the **System Configuration** menu, then **Restore Security Defaults**.

   d. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select the tag that has been set. Press the spacebar once to clear the tag, then press Enter to return to the prior menu.

   e. If a DriveLock password is set, select the **Security** menu, scroll down to **DriveLock**, then select **DriveLock password**. Select the desired hard drive. Click **Disable protection**, enter the existing master DriveLock password, then press Enter to confirm and return to the prior menu. Repeat this procedure if more than one hard drive has a DriveLock password.

   f. If an Automatic DriveLock password is set, select the **Security menu**, scroll down to **Automatic DriveLock**, then select the desired hard drive and disable protection. Repeat this procedure if more than one hard drive has an Automatic DriveLock password.

   g. Select the **File** menu, then **Reset BIOS Security** to factory default. Click **yes** at the warning message.

   h. Select the **File** menu, then **Save Changes and Exit**.

   i. Reboot the system. If the system has a Trusted Platform Module and/or fingerprint sensor, one or two prompts will appear: one to clear the TPM and the other to reset fingerprint sensor. Press F1 to accept or F2 to reject.

   If the HP notebook model number ends in a ‘p’ or ‘w’ and includes Intel Centrino with VProTM, reboot the PC and enter BIOS Setup by pressing F10 when prompted. Select **System**

Configuration, then **AMT Options**. Then select **Un-configure AMT on next boot**. Select **Save**, then **Yes**. Select the **File** menu, and then select **Save Changes and Exit**. Reboot the system and confirm that you want to un-configure AMT.

j. If the optional Intel Anti-Theft Technology (AT) was activated, contact the provider to deactivate it.

k. If the optional Absolute® Software Computrace® management and tracking service was activated on the notebook PC, contact the provider to deactivate it.

l. Remove all power and system batteries for at least 24 hours.

2. Remove and retain the storage drive or clear the contents of the drive.

a. Hard Disk Drive (HDD)

Clear the HDD contents by using the HP Disk Sanitizer® utility or a third party application that, ideally, is U.S. Department of Defense (DOD) 5220.22-M approved.

To run HP Disk Sanitizer, enter BIOS Setup by powering on the system and pressing F10 when prompted near the bottom of the display, or press ESC to display the start up menu, then press F10. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Disk Sanitizer** and select the desired drive. For a higher level of protection, select **Optimum**.

NOTE: This process will take a long time, and the amount of time varies based on the hard drive capacity.

b. Solid State Drive (SSD)

Clear the SSD contents by using the BIOS Setup Secure Erase command option, or by using a third party utility designed to erase data from an SSD. To run Secure Erase, enter BIOS Setup by powering on the system and pressing F10 when prompted near the bottom of the display. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Secure Erase** and select the desired hard drive.

Non-volatile memory usage

Non Volatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write protected?
Real Time Clock (RTC) battery backed-up CMOS configuration memory (CMOS)	256 Bytes	No	Yes	Stores system date and time and limited keyboard controller data.	Using the F10 Setup utility or changing the Microsoft Windows date and time.	This memory is not write-protected. HP recommends password protecting the F10 Setup utility.
Controller (NIC) EEPROM	64 KBytes (not customer accessible)	No	Yes	Store NIC configuration and NIC firmware.	Using a utility from the NIC vendor that can be run from DOS.	A utility is required to write data to this memory and is available from NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC nonfunctional.
Keyboard ROM	64 KBytes (not customer accessible)	No	Yes	Stores firmware code (keyboard, mouse, & battery management).	Programmed at the factory. Code is updated when the system BIOS is updated.	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	Programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a PC. The specific write protection method varies by memory vendor.
System BIOS	4 to 5 MBytes	Yes	Yes	Store system BIOS code and PC configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can

Non Volatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write protected?
					input using the F10 setup utility or a custom utility.	render the PC nonfunctional.
Intel Management Engine Firmware (present only in models ending in a 'p' or 'w' or with Intel Centrino Pro technology)	1.5 or 5 MBytes	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The third party data store contents can populated by a remote management console or local applications registered by an administrator to have access to the space.	The Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility is required for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.
Bluetooth flash	2 MBits	No	Yes	Stores Bluetooth configuration and firmware.	Programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility is required for writing data to this memory and is made available through newer versions of the driver if the flash requires an upgrade.
802.11 WLAN EEPROM	4 KBytes to 8 KBytes	No	Yes	Stores configuration and calibration data.	Programmed at the factory. Tools for writing data to this memory are not made public.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.

Non Volatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write protected?
Webcamera	64 KBits	No	Yes	Store webcamera configuration and firmware.	Using a utility from the device manufacturer that can be run from Windows.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader	512 KBytes flash	Yes	Yes	Stores fingerprint templates.	By enrolling in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

1. **How can the BIOS settings be restored (returned to default settings)?**

   a. Turn on or restart the computer and press F10 when prompted near the bottom of the display.

   b. Select **File**, then select **Restore defaults**.

   c. Follow the on-screen instructions.

   d. Select **File**, save changes and exit, then press Enter.

2. **What kind of configuration data is stored on the DIMM Serial Presence Detect (SPD) memory module? How would this data be written?**

   The DIMM SPD memory contains information about the memory module such as size, serial number, data width, speed/timing, voltage and thermal information. This information is written by the module manufacturer and stored on an EEPROM. This EEPROM cannot be written to when the memory module is installed in a PC. Third party tools do exist that can write to the EEPROM when the memory module is not installed in a PC. There are various third party tools available to read SPD memory.

3. **Does the “Firmware Hub for System BIOS” contain the BIOS program? Is this chip writable, and if so how?**

   The Firmware Hub does contain the BIOS program and is writable. A utility is required to perform the write function.

4. **In some PC systems, the Firmware Hub for System BIOS is a flash memory chip so that updates can be written by the customer. Is this true for these BIOS chips?**

   Yes, they are flash memory chips.

5. **What is meant by “Restore the nonvolatile memory found in Intel-based system boards?”**

   This relates to clearing the Real Time Clock (RTC) CMOS memory that contains PC configuration data.

6. **Does resetting the CMOS configuration memory return the PC back to factory defaults?**

   The process of resetting the CMOS will return certain system settings to factory default but will not reset many of the system data and configuration defaults to their default settings. To return these system data and configuration defaults to default settings, refer to question and answer 1 and follow the instructions for returning the BIOS settings to factory defaults.

13 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC, or from 220 to 240 volts AC.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries and regions must meet the requirements of the country or region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.2 ft) and no more than **1.8 m** (6 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	COC	5
South Korea	EK	4

Country/region	Accredited agency	Applicable note number
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

14 Recycling

When a non-rechargeable or rechargeable battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at http://www.hp.com/recycle.

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